COMMERCIAL FERTILIZER

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DECEMBER, 1952

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through ***AA Quality*** factories and sales offices

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Superphosphate — Sulphuric Acid
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At a recent U. S. D. A. Fertilizer Industry Advisory Committee meeting the following was emphasized in the statement "that year-round movement of fertilizer materials into the using areas for storage should be encouraged as a solution to storage and distribution problems."

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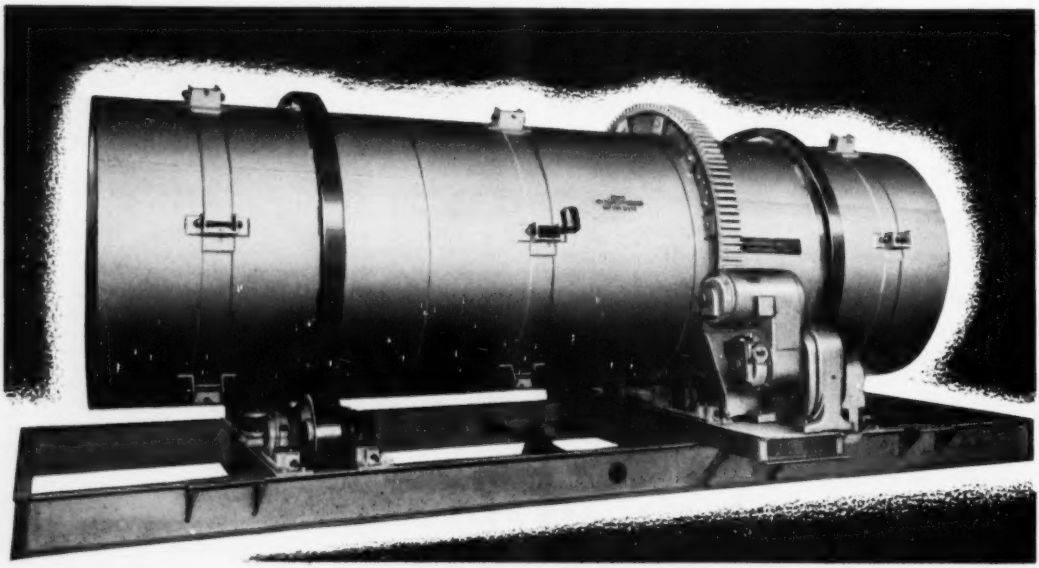

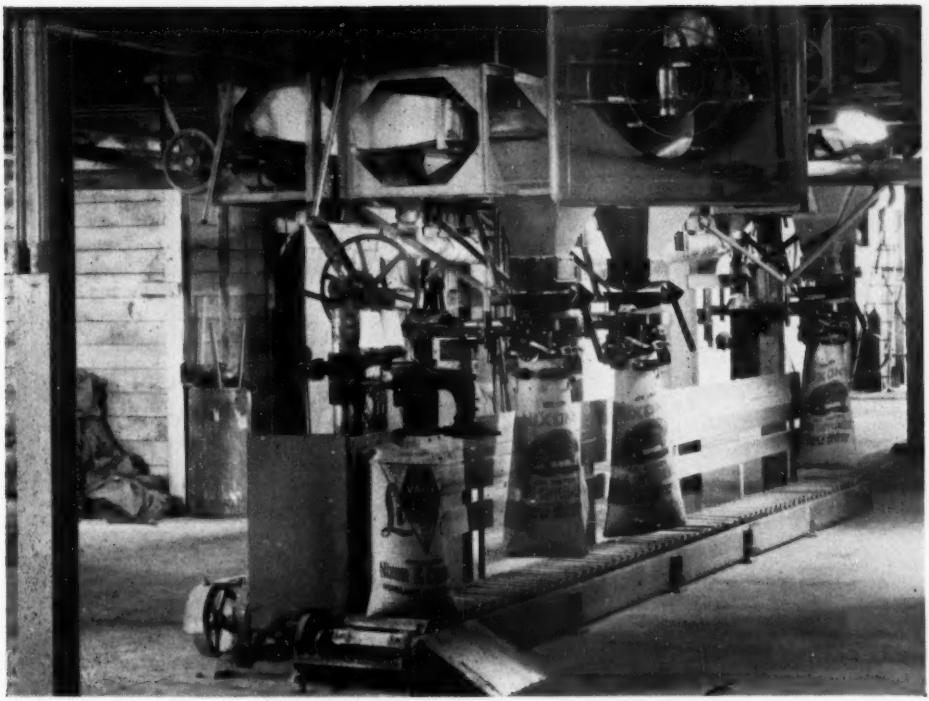

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COMMERCIAL FERTILIZER

ESTABLISHED 1910

December, 1952

Vol. 85 No. 6

ADVERTISING INDEX

Published Monthly by

WALTER W. BROWN PUBLISHING CO., INC.

75 Third St. N. W., Atlanta, Georgia Phone Atwood 4160

ERNEST H. ABERNETHY, *President*

BRUCE MORAN, *Editor* V. T. CRENSHAW, *Business Manager*

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

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COMMERCIAL FERTILIZER, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1879. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta Georgia.

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

The word on a Multiwall buyer's tongue just after he's said, "Well, as long as we order by specification, I guess one brand's as good as another . . ."

Executives who purchase more than 85 per cent of all Multiwalls have a big BUT there.

They testify* that there are many other considerations. Among the most important, the reputation of the manufacturer. They judge him by his record of reliability, his effort to meet delivery dates, his willingness to give a full measure of service.

We welcome the challenge of the toughest three-letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

*August, 1951 research study.

UNION BAG & PAPER CORPORATION • NEW YORK: WOOLWORTH BUILDING • CHICAGO: DAILY NEWS BUILDING

1000 pounds of 10-10-10 plowed down nearly doubles corn and potato yields for Leon Epler,

NORTHUMBERLAND, PA.

● Until 1948, Leon Epler of Northumberland, Pa., was getting corn yields of 40 to 50 bushels per acre by using approximately 250 pounds of row fertilizer. But that year he began plowing down 1000 pounds of 10-10-10 in addition to the row fertilizer. His yield jumped to 70-75 bushels per acre.

He climaxed this outstanding production in 1950 with a plot that yielded 122.1 bushels per acre in the Five Acre Corn Club contest sponsored by the Pennsylvania Crop Improvement Association. The special fertilizing program used on this plot included 10-10-10.

Plowing under 800-1000 pounds of 10-10-10 gave Mr. Epler equally outstanding results on potatoes. His average yield jumped from 300-350 bushels per acre to 500-550 bushels. Improved spraying and cultural methods also played a role in this increase.

Bigger yields for farmers mean better business for you

● On all types of crops, high-nitrogen complete fertilizers are paying for themselves over and over through higher quantity and better quality yields.

Every bumper crop produced by high-nitrogen fertilizers increases the demand for these products. And now is the time for you to cash in on this demand by putting heavy promotional effort behind the high-nitrogen fertilizers in your line.

When you use U·S·S Ammonium Sulphate in your mixed fertilizers, you'll find the selling job easier. Farmers know the name "United States Steel" stands for top quality. Many of them have used U·S·S Ammonium Sulphate as a straight-nitrogen material . . . they know it's dry and free-running . . . they know it won't set up in storage and that it handles well in distributing equipment.

For complete details on U·S·S Ammonium Sulphate contact our nearest Coal Chemical Sales Office or write directly to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

U·S·S AMMONIUM SULPHATE

USS

2-1429

UNITED STATES STEEL

JUST AROUND THE CORNER

By Vernon Mount

THE PENDULUM SWUNG, as this department has been predicting it would for the past couple of years. And it swung with a vengeance! Never have so many voted. Never has there been so positive a mandate from the people...all the people...One third of all the men, women and children in the US voted.

SANTA CLAUS IS NOT DEAD, but the swing to the right was a swing to the jaw for the do-gooders with other people's money. It was a vote for more business in government, and less government in business.

PROFITS ARE NO LONGER A CRIME, nor will "Soak the rich" be a popular slogan. There's no guarantee how long the swing will last, but we know what the next four years will be, at least. And we can hope some of it will stick.

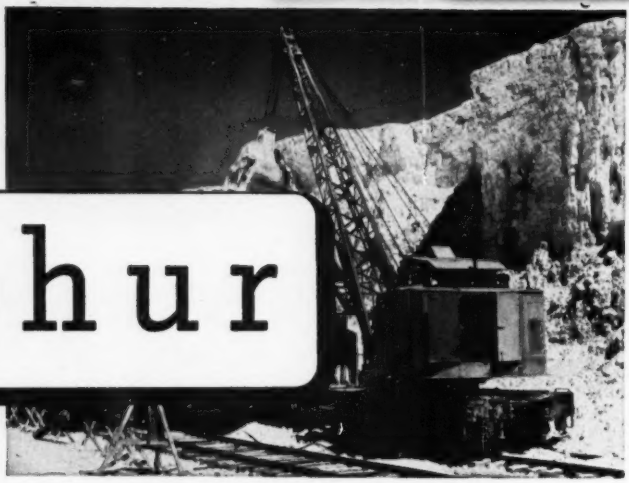
WORK WILL BECOME HONORABLE. Slowly, because it is a big job to educate the New Deal out of a generation that has known nothing else, the respectability of working for a living will return to the American people.

INVESTORS WILL FEEL SAFE and a great deal of risk capital will come out of hiding and go to work. It can mean an era of great expansion. It does mean the beginning of a new economic era in the United States--and perhaps in the rest of the Free World.

Yours faithfully,

Vernon Mount

Sulphur



Thousands of tons mined daily, but where does it all go?

Did you ever have the misfortune on a steaming, sticky, sultry day to sit it out on a crowded parkway, bumper to bumper, waiting for traffic to clear? No doubt your thoughts were plenty sulphurous but probably not along the lines we have in mind.

We're thinking of the mineral Sulphur and its link with the automobile. Each car accounts for a substantial poundage of Sulphur, some estimates put it at around 25 pounds for the average car. Give or take 5 pounds, it shows that a tremendous tonnage of Sulphur is needed each year to put cars, buses and trucks on the road ready to operate. And don't forget the tire and battery replacements going on every day.

Sulphur enters the automobile picture through the tires, steel sheets, plated and plastic fittings, glass, battery acid and parts, copper tubing and wiring . . . all of which call for the use of Sulphur or its compounds in connection with their manufacture.

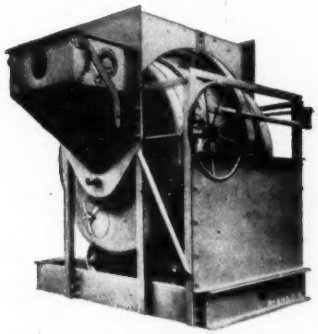
Can you wonder that Sulphur goes into industry just about as fast as the sulphur producers of the Gulf Coast Region can get it above ground and cooled preparatory to shipment?

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas
Spindletop, Texas • Worland, Wyoming

He can't stand that slow mixing cycle!



WORTHINGTON DRUM-TYPE FERTILIZER MIXER, one of the complete Worthington line of industrial mixers of all kinds that incorporate features and advantages brought about during nearly a century of experience in mixer design. Standard sizes of fertilizer mixers, ½, 1, 2, 3-ton capacity.

WORTHINGTON

Industrial Mixers

Wait! Our way is easier! It's a mixer that can boost your daily output as much as 10 per cent—the *Worthington fertilizer mixer*. Secret of the fast mixing action is Worthington's engineered blade design which gives the fastest mixing cycle we know of. You save time with every batch. Mixing is thorough, too, and special mixer design is such that it eliminates these other big problems for you:

THE CORRODED DISCHARGE CHUTE—The Worthington discharge chute is out of the mixer during mixing time. Proper balance makes manual control of chute easy. Pneumatic controls also available.

THE WOBBLY DRUM ROLLER—Worthington drum rollers are of genuine carwheel metal, ground to exact diameter. Compensation for wear to permit perfect centering is accomplished by easy adjustment of drum-roller shafts.

THE HEAVY HORSEPOWER CONSUMER—Worthington's clean, anti-friction construction with specially designed parts assures minimum possible horsepower consumption.

YR.2.A

SEND THIS COUPON TODAY to learn more about how to reduce mixing time with a Worthington fertilizer mixer.

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Industrial Mixer Division, Plainfield, New Jersey

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Complete Fertilizers · Superphosphate
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Phosphate Rock, *Ground and Unground*
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CHEMICALS: Sulphuric Acid · Phosphorus · Phosphoric Acid · Ferrophosphorus · Sodium Phosphates · Sodium Silicates · Phosphorus Chlorides, Tetraethyl Pyrophosphate and other organic Phosphorus compounds.

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FIBERS: Vicara®—The Fiber that Improves the Blend. Zycon® Wavecrepe®

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Laborer. . . 1952 MODEL

No matter how good a man may be with a hand shovel and wheelbarrow, his production is many times greater as a "PAYLOADER" pilot. What's more — both he and his boss are happier because they both make more money.

In hundreds of fertilizer and chemical plants "PAYLOADERS" have taken over unpleasant, laborious material-moving chores — saving time, cutting costs and increasing production. They scoop up, carry, dump, spread and stockpile all kinds of materials such as fertilizer, chemicals, coal, coke and ashes . . . lift, push . . . spot and unload box cars and do many other cost-cutting jobs . . . release manpower for more productive work.

Every "PAYLOADER" is a complete Hough-built tractor-shovel designed specifically for tractor-shovel work, with multiple reverse speeds, large pneumatic tires and other features that insure fast, low-cost performance over floors or unpaved ground, up and down ramps, through congested areas. The "PAYLOADER" is sold by a world-wide Distributor organization with complete service facilities and seven sizes are available from 12 cu. ft. to 1½ cu. yd. bucket capacity. The Frank G. Hough Co., 702 Sunnyside Ave., Libertyville, Illinois.

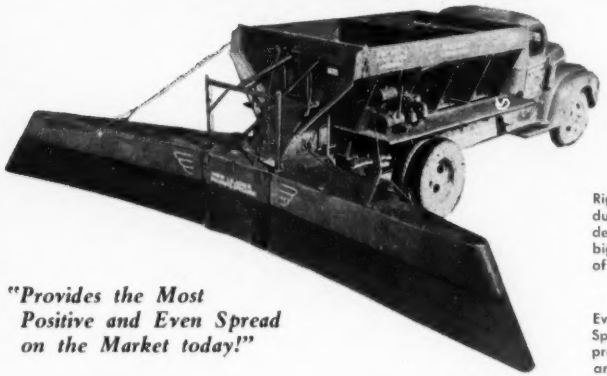
JOB STUDIES are available without cost or obligation. Each one is a detailed, authorized word-and-picture report of "PAYLOADER" performance in a specific plant. A request on your letterhead is all that's necessary.

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • SINCE 1920

INCREASE YOUR SALES OF COMMERCIAL FERTILIZER AND LIMESTONE



"Provides the Most Positive and Even Spread on the Market today!"

by recommending the "New Leader" SPREADER *for Custom Spreading*

Right in your territory, there are men who can be induced to go into the business of custom spreading. Many dealers of commercial fertilizer and limestone are getting bigger sales volume through the aggressive promotion of the custom spreading idea.

URGE YOUR SALESMEN TO BE ON THE LOOKOUT FOR CUSTOM SPREADING PROSPECTS!

Every time you induce a man to buy a "New Leader" Spreader, you make a friend and a customer. He will promote the sale of commercial fertilizer and limestone and you will make a profit on the fertilizer which he buys from you.

"NEW LEADER" Scores 10 FIRSTS

1. The first successful truck mounted lime spreader that could handle stock-pile lime satisfactorily.
2. The first successful lime spreader with a chain conveyor.
3. The first lime spreader built with Twin Distributor Discs.
4. The first lime spreader with successful center dump.
5. The first lime spreader with a back endgate swinging wide open.
6. The first lime spreader with running boards or catwalks as standard equipment.
7. The first lime spreader with a 24" wide conveyor trough.
8. The first spreader with an all-steel frame and wooden hopper.
9. The first lime spreader with a successful attachment for spreading bulk or sacked commercial fertilizer.
10. And now! The first commercial fertilizer spreader with distributor discs driven at a constant speed by a separate motor. Conveyor chain positively synchronized with speed of rear truck wheels, assuring full width spread at all times and uniform distribution.

The Complete "New Leader" Line INCLUDES

- BULKMASTER
- LIMESTONE SPREADER
- SELF-UNLOADING
- BULK TRANSPORT
- TAILGATE SAND AND CINDER SPREADER
- HI-WAY MATERIAL SPREADER
- BULKMASTER, JR.
- COMB. COMMERCIAL FERTILIZER AND LIMESTONE SPREADER
- FEEDMASTER
- TRUCK MOUNTED SAND AND CINDER SPREADER

"New Leader" Spreaders spread a minimum of 100 pounds per acre, to any maximum desired up to 4½ tons per acre. Send coupon for free literature and name of your local distributor.

"NEW LEADER" SELF-UNLOADING BULK TRANSPORT

Penninsular Spreading Service of Kissimmee, Florida purchased three 33-ft. New Leader Self-Unloading Bulk Transports and two New Leader Fertilizer Spreaders for spreading fertilizer on pastures and in citrus groves. This 20-ton transport with elevator in place is ready to load a "New Leader" Spreader Truck. Eliminates demurrage on freight cars; gets fertilizer to the job quickly. Spreader trucks can stay in field as this is a complete self-unloading unit, leaving tractor free to return for another transport load. Unit divided into four 5-ton compartments. Each may be unloaded independently. Compartments and endgate removable for hauling bagged and packaged goods. Capacity 5 to 25 tons, 11 to 40 feet long.

HIGHWAY EQUIPMENT COMPANY, INC.

Manufacturers of the World's most complete line of Spreaders and Bulk Delivery Equipment

635 D Ave., N. W. Cedar Rapids, Iowa

Send full information on:

Spreader ..... Bulk Transport .....

Bulkmaster ..... Complete line .....

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Address .....

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December, 1952

*With its 17,000,000 acres of scientifically tree-farmed woodlands—twenty huge pulp, paper and board mills—another twenty converting plants devoted exclusively to products for modern packaging...with these, the International Paper Company and its affiliated companies serve as a vast reservoir of raw materials, facilities and "know-how" for the quality production of Bagpak Multiwall Paper Shipping Bags.

Bagpak also furnishes Bag Closing Machines. For details about bags and machines write to Bagpak Division, International Paper Company, 220 East 42nd St., New York 17, Dept. C-8

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RANDOM
Notes & Quotes

Field crews, spreading over the state of Ohio are compiling data which in effect is an inventory of the land. When they get through they will have complete maps, county by county, showing the basic soil characteristics. Director A. W. Marion, Dept. of Natural Resources is directing the operation with John W. Ferguson as chief of the division.

* * *

Other legislatures please copy: West Virginia farmers and fruit growers can now buy fertilizer, insecticides and other chemicals without paying the state's 2% sales and service tax . . . thanks to a vigorous campaign by the West Virginia Congress of Agriculture.

* * *

Up from down under comes word of a seed and fertilizer spreader which operates on centrifugal force —a revolving disk throwing out a stream of seed or fertilizer, distance controlled by speed of the disk. 15 feet is normal operating throw. Mr. G. A. Hipwell is the Australian developer of the idea.

* * *

It's an ill wind etc. . . . Stauffer Chemical made a labor agreement with UMW governing the employees at the Perry, Ohio, plant which calls for two bars of Ivory Soap per employee per month!

* * *

The North Carolina Agricultural Review points out that, although the Department of Agriculture there has one of the most modern and best equipped soil testing laboratories in the US, and the service is free, the total is only a third of the goal of a sample for every fifty acres each year.

* * *

USDA releases figures showing Arizona led the entire US in cash farm income gain in 1952 with 47.7%. Oregon 38.8%; Maine 33.3%; South Carolina 31.9%; California 27.9% to quote the top five only.

More than half the disaster loans made by USDA in the last 3 years have already been repaid . . . and that means 90% of those that have come due—some $47,000,000. Interest collection, they figure, will wipe out any losses.

* * *

In "Newscasting" V-C's attractive house organ, Gordon B. Nance and John Falloon, Missouri U. College of Agriculture, are quoted as saying the earning power of a dollar's worth of fertilizer has doubled in the last dozen years. Formerly a dollar brought back three dollars extra in crops. Now fertilizer is relatively cheaper than it was even in 1939, when it was surely a bargain, and a dollar brings back from $6 to $7 in extra crops.

* * *

In Iowa 24 landowners have found a new way to check their progress in stopping erosion. They measure the depth of the lake into which their land drains.

* * *

"America's food surplus is a world asset made possible by scientists and engineers, but there are still many opportunities that challenge us." So said Clarence Francis, chairman, **General Food, recently.**

* * *

"A strong, productive industry is the nation's greatest safeguard for peace." Said Crawford H. Greenewalt, DuPont president.

It Seems to Me

by BRUCE MORAN

Ezra Taft Benson, the Eisenhower Secretary of Agriculture, has a unique background. Directly, he is experienced in agriculture because he was an Idaho farmer, a county agent, and economist and market specialist for the University of Idaho AES.

Then he broadened out. He put in 5 years as executive secretary of the National Council of Farmer Cooperatives. Since 1943 he has been on the American Institute of Cooperatives Executive Committee.

Nor is his viewpoint insular. As a Mormon, he has served as President of the Mormon Mission—international in scope.

At the age of 53 he is a seasoned, and experienced executive. And while his experience has been gained wholly among cooperatives, the Fertilizer Industry can surely welcome the fact that he has had real experience in our field.

CFA 29th ANNUAL CONVENTION

The California Fertilizer Association has just completed its Twenty-Ninth Annual Convention at The Desert Inn, Palm Springs.

A record breaking 400 attended from all over the West and from Canada, Chicago, New York, and Washington. Officers reelected to serve during the coming year were S. B. Tatem, Swift & Company, Los Angeles, President; B. H. Jones, Sunland Industries, Inc., Fresno, Vice President; Jack Baker, Bandini Fertilizer Co., Los Angeles, Secretary; William E. Snyder, Wilbur-Ellis Co., Los Angeles, Treasurer; and Sidney H. Bierly, Los Angeles, Executive Secretary & Manager.

James M. Quinn, California Sun Fertilizer Co., Los Angeles, was reelected to another three-year term on the Board of Directors. Two new Directors elected to serve three-year terms are Howard G. Conley, Pacific Guano Co., Berkeley; and Howard H. Hawkins, Golden State Plant Food Company, Glendora. Retiring from the Board of Directors were Ralph J. Crum, Pacific Guano Co., Berkeley; and Charles Monoogian, Downey Fertilizer Co., Downey.

Dean Laurence Lockley of the School of Commerce, University of Southern California, in the principal address credited the system of free enterprise capitalism with having provided Americans with the highest standard of living in the history of the world. He pointed out that in recent years the Federal government has assumed a planning role which is sapping the foundations of our economic order. In order to save that which remains, he said that we must have three conditions. First, we must be able to enter or leave any lawful business in accordance with our own appraisal of the advantages of doing so. Second, competition shall be the regulator of business. Third, we must rely on free prices to determine the kinds and amounts of goods and services we produce and consume. While agreeing that adequate policing must be maintained in the public interest, he said that we have reached a point where there is too much government interference with business.

An outline of the water development plan for California was presented by T. R. Simpson, Professor of Irrigation Engineering, University of California, Berkeley. Most of California's surplus waters, both surface and underground, are in the northern half of the state. It is hoped that 100,000 acre feet will be diverted annually to 50,000 acres of new land from the Folsom Reservoir during the next ten years. Critical areas of underground water depletion include the west side of the San Joaquin Valley, where he said current pumping volume will likely exhaust water storage in the next ten years. The Dinuba-McFarland and the Arvin-Edison areas are being severely depleted. Pine Flat and Isabella Dams should provide better regulated water supply for irrigation, and bring new land under irrigation. The south coastal area, from Ventura to San Diego county, inclusive, consisting of almost 11,000 square miles, enjoys water imported from the Colorado River. Owens Valley and Mono Basin to the extent of about 500,000 acre feet annually, which has helped to hold ground water overdrafts to a minimum. The State has begun the formulation of plans of the Oroville Dam on the Feather River and of a conduit to convey surplus water to Southern California.

Others on the program were Z. H. Beers, Executive Secretary of the Middlewest Soil Improvement Committee, Chicago, who outlined the close relationship existing there between the fertilizer industry, the Universities of thirteen states, and the farmers of that area. Dr. Russell Coleman, President of the National Fertilizer Association, Washington, D. C., spoke on the subject, "Where is all the Fertilizer Going?", and Paul T. Truitt, President of the American Plant Food Council, Inc., also of Washington, outlined the new U.S.D.A.—Land Grant College Fertilizer Use Program. Warren T. Schoonover, Soils Specialist, Agricultural Extension Service, Berkeley, followed Truitt with California's place in the program.

Weller Noble, President of Pacific Guano Company, Berkeley, told of the fertilizer materials supply situation, and projected the picture through the year to come. He compared the volume of fertilizers used in California in 1940 and 1951 (216,735 tons and 731,400 tons, respectively). The increase was 514,665 tons, or 23%, which the efforts of the growing fertilizer industry made possible. Indications are that the principal materials will be in somewhat better supply than during the past year, with the exception of treble superphosphate, ammonium nitrate, and, during the first four months of 1953, sulphate of ammonia.

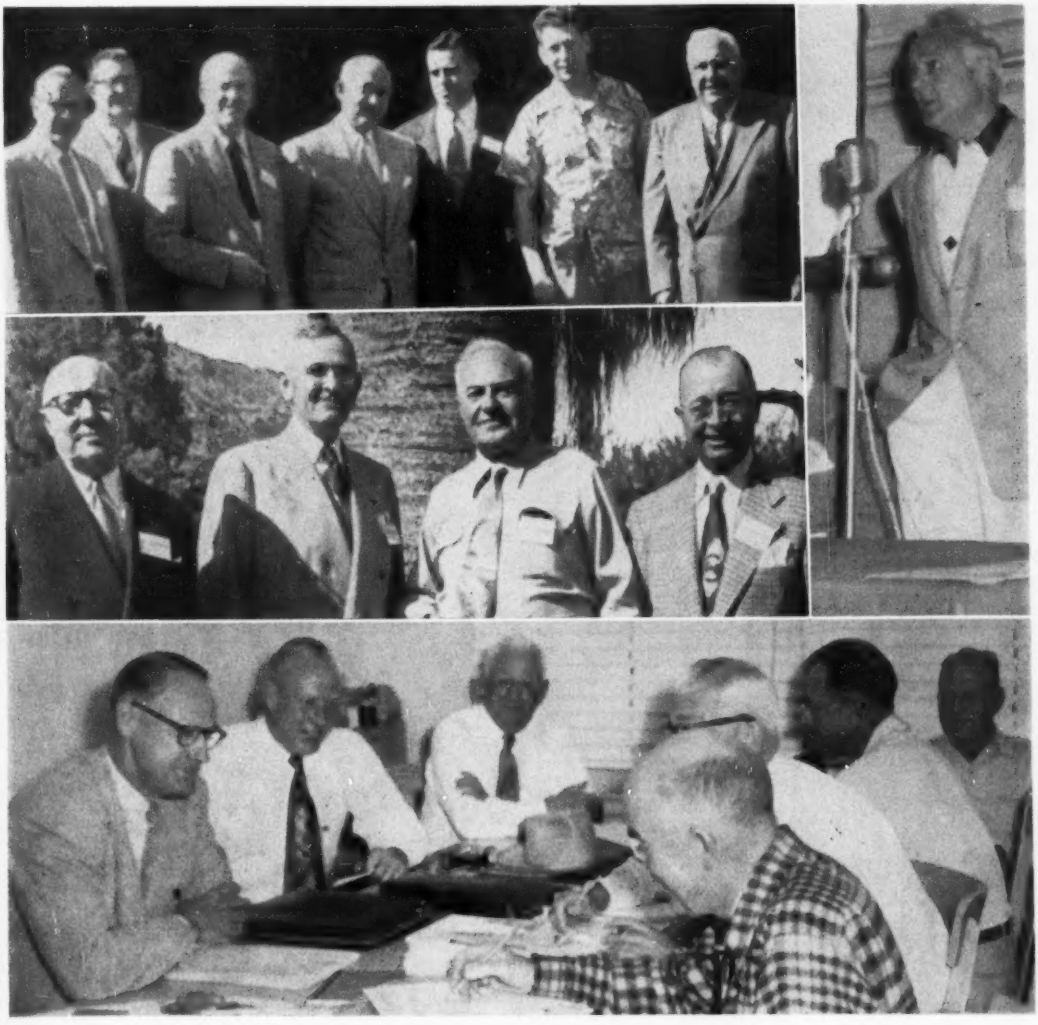
Wednesday morning was devoted to the State Bureau of Chemistry, which provided excellent papers on the new chemical soil conditioners, on industrial plant accident prevention, on the trend of fertilizer use in the west, and a report on its activities during the past year. The Soil Improvement Committee of the Association presented six interesting reports on fertilizer experiments under way at Experiment and Field Station test plots throughout California. Those who participated here were Dr. L. C. Cochran and Dr. D. G. Aldrich, Jr., both of the Citrus Experiment Station, Riverside; Dr. B. A. Krantz, Southwestern Irrigation Field Station, Brawley; Dr. D.

S. Mikkelsen; Dr. O. A. Lorenz; and F. J. Hills of the Agricultural Experiment Station, Davis.

Tuesday, November 11, was devoted to reception, with prizes awarded winners of men's and women's golf tournaments, women's putting, bowling and bridge. Ideal weather contributed to the Convention's success. Two memorable cocktail parties were given, one on Monday evening by Balfour, Guthrie & Co., Ltd., and the other on Wednesday evening by American Potash & Chemical Corporation. The Convention closed with the annual banquet and dinner dance.

The time and location for the 1953 Convention will be determined by the Association's Board of Directors at its next meeting.

1. CFA Board of Directors: Jack Baker, Bandini Fertilizer Co., Los Angeles, Howard G. Conley, Pacific Guano Co., Berkeley, James M. Quinn, Calif. Sun Fertilizer Co., Los Angeles, President, S. B. Tatem, Swift & Co., Los Angeles, Lowell Berry, The Best Fertilizers Co., Oakland, William E. Snyder, Wilbur-Ellis Co., Los Angeles, William E. Simas, The Triangle Co., Salinas. (Not in photo: B. H. Jones, Sunland Industries, Fresno, Howard H. Hawkins, Golden State Plant Food Co., Glendora, Howard Houston, Mid-State Chemical Supply Co., Lindsay, Manager Sidney H. Bierly, Los Angeles.)
2. Four charter members of CFA: Geirge P. Bloxham, Pacific Guano Co., Los Angeles, Weller Noble, Pacific Guano Co., Sidney Herzberg, Ontario Fert. Works, Ontario, T. Walter Houser, Southern Calif. Fertilizer Co., Los Angeles. 3. Members CFA Soil Improvement Committee: Clockwise around the table beginning at left: F. Haven Leavitt, Shell Chemical Corp., San Francisco, George Wickstrom, American Potash Inst., Seattle, Dr. Wallace Macfarlane, Pacific Guano Co., Los Angeles, Earl R. Mog, Growers Fertilizer Co., Stockton, J. N. Nelson, American Potash Institute, San Jose, Earle J. Shaw, Chilean Nitrate Sales Corp., Los Angeles. 4. Chas. D. Farrell, Palm Springs Mayor, welcoming delegates.



ONE OF THE LARGEST NFA CONVENTIONS EVER

The figures had not been totalled up as we flew toward home base and our typewriter, but it looked as though the Miami Beach meeting of National Fertilizer Association had broken all previous attendance records. It was a big meeting. And it was a constructive and a well balanced convention.

Basically, it was a forward-looking meeting. New technical problems ahead, to be solved and in process of solution. Marketing problems which could lie ahead, and are very much worth thinking about, just in case. Sound thinking and straight-from-the shoulder talking about an industry which finds itself converting from one that ground up and mixed ingredients, to one that is an involved chemical operation.

That was the kind of talk on the convention floor, as well as in the lobbies and elsewhere, as old friends met again and compared notes—and as new faces appeared, eager for the latest information on new plant construction, and the conversion of old plants to the new techniques and the new selling problems ahead. It was a good convention from a fun standpoint, and because Miami Beach is a good place to have fun.

So let's tell the story in sequence, in an effort to give you the highlights in the short time we have between the convention itself and the demands of the printer, who is waiting for these words to go into metal.

Thursday November 20 the morning session opened promptly and on time. The first speaker, NFA vice-president Raoul Allstetter set the basic background with a review of the situation in NPK supply and the goals established through 1955 by the Government, with most of which our readers are thoroughly familiar through publication in recent issues. A special point of the slides he presented however, was a series of graphs showing how the ratios of NPK are rapidly leveling off nationwide so that we are seemingly approaching a period of high analysis with equal quantities of N, P and K in the analysis.

SPEAKERS AT NFA CONVENTION: Top group—Thursday morning speakers include W. R. Alstetter, NFA; Warren Garst, Home State Bank, Jefferson, Iowa; Willard M. Fifield, Director of Florida AES; and NFA vice-chairman E. A. Geohegan. Lower group—the panel who presented the symposium on Ammoniation Technology: T. C. Rogers, Nitrogen Division; Joe C. Sharp, Spencer Chemical; Ove F. Jensen, Dupont; W. E. Schaffnit, Stedman Foundry. George V. Taylor, Spencer Chemical, presided; Edwin C. Kapusta, NFA was secretary. The pictures at the rostrum are—top, W. N. Watmough, Jr. Davison Chemical; lower, A. H. Moseman, USDA.

KEY TO PICTURES

1. Governor Tom Dewey, "one of your best customers" he tells C. D. Shallenberger, and Ira Moss, both of Shreveport Fertilizer Works, Shreveport, La., **2.** B. B. Fall, Rogers & Hubbard Co., Portland, Conn., Graham Campbell, Chamberlain & Barclay, Inc., Cranbury, N. J. **3.** Fred Lodge, National Fertilizer Association, P. H. Groggins, National Production Authority, both of Washington. **4.** Warren Belser, U. S. Steel Co., Birmingham, Ala., Joe Stough, International Minerals & Chemical Corp., Chicago, Ill. **5.** Joe Harrell, Southwest Potash Corp., Atlanta, Ga., Ira Moss, Shreveport Fertilizer Works, Shreveport, La. **6.** B. B. Fall, Rogers & Hubbard Co., Portland, Conn., W. A. Webster, Chicago, Ill., and C. A. Chambers, Cornelia, Ga., both of Quaker Oats Co. **7.** James E. Madigan, Green Bay, Wisc., and H. E. Smithers, Gainesville, Fla., both of Fertilizer Engineering & Equipment Co. **8.** Dr. A. H. Moseman, Chief Bur. Plant Industry, Soils and Agric. Engineering, USDA, Dr. Russell Coleman, National Fertilizer Association, Washington, Jack Rutland, International Minerals & Chemical Corp., Chicago, Ill. **9.** B. E. Brown, Knoxville Fertilizer Co., Knoxville, Tenn., E. N. Shelton, Tennessee Corp., Atlanta, Ga. **10.** Chas. McDowell, Winter Park, Fla., A. A. Green, Jackson Fertilizer Co., Jackson, Miss. **11.** C. R. Sparks, Buhner Fertilizer Co., Seymour, Ind., Joe C. Sharp, Spencer Chemical Co., Kansas City, Mo. **12.** W. L. Waring, Lyons Fertilizer Co., Tampa, Ralph Boynton, U. S. Potash Co., Atlanta, Ga. **13.** Harvey Melson, Melson Fertilizer Co., Georgetown, Del., R. P. Thomas, International Minerals & Chemical Corp., Chicago. **14.** D. N. Weatherly and W. C. Davis, both of the John J. Harte Co., Atlanta, Ga. **15.** Alex M. and H. H. McIver, both of Alex M. McIver & Son, Charleston, S. C.

Not only Mr. Alstetter, but other speakers as well stressed the fact that the farmer can profitably use far more fertilizer than he is now doing, and that education can well make the present production levels look small, some years from now. This is an answer to the question that hung in the air over the meeting—"What will happen to volume if we have a recession?"

As Mr. Alstetter sees it, if we can get over to the farmer and his banker and landlord-merchant counsellors the economic facts about fertilizer, we can convince them all that, come lower prices, fertilizer would be the last "expense" item to cut off the budget. Costs have risen and are still rising for the farmer, and fertilizer—producing high yield —can help level these other costs down again to levels demanded by softening basic crop markets.

He talked a while on soil tests, and the need for better understanding of what is already present in the soil in the way of plant foods, and made an eloquent plea for more money for the colleges so they can set up facilities to handle the soil tests already demanded, as well as additional soil-test volume to come.

In conjunction with the education of bankers, he suggested that fertilizer people get on the programs of state banker conventions to present the economic background of our product.

The next item on the program was the showing of the new movie, in full sound and beautiful color, produced by NFA. This is based on the fundamental that a farmer should get a minimum of 100 bushels of corn to the acre—and by so doing maintain his land fertility level. The whole philosophy of the approach of this fine picture is that it is doubly profitable—because of the immediate crop-income and because the land is maintained at fertility and tillage levels, and does not require spasmodic and thereby expensive spurts of building up.

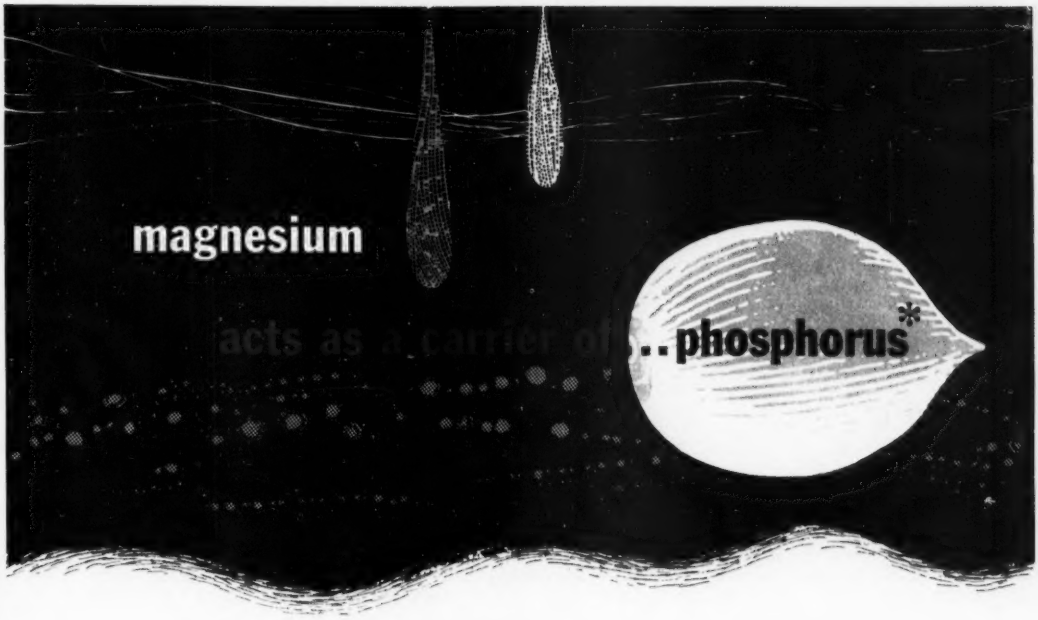
Directed and photographed by NFA's Robert H. Engle, "Cash in on Corn" was produced under the guidance of an advisory committee composed of W. E. Colwell, Head, Agronomy Department, North Carolina State; Porter Hedge, Assistant to the Administrator, Production & Marketing Administration, U. S. Department of Agriculture; R. Q. Parks, Head, Division of Soil Management & Irrigation, U. S. Department of Agriculture; R. M. Salter, Chief, Soil Conservation Service, U. S. Department of Agriculture; George D. Scarseth, Director of Research, American Farm Research Association; and H. H. Tucker, Chairman, Plant Food Research Committee, NFA has fifty prints which they can loan you. But if you want one for use regularly in your own territory you can own a print for $100 to which, by the way, you can attach your own trailer film.

Requests for loan of the film should be directed to NFA at 616 Investment Building, Washington 5, D. C. giving the dates you want to show it.

Warren Garst is a banker. He is executive vice-president of the Home State Bank in Jefferson, Iowa. But we feel after listening to him talk that the only time he shows any signs of a glass eye is when he detects someone standing in the way of the progress of the farmers of his area.

Some years ago when hybrid corn

Random shots at Roney Plaza cabanas and beach; easily spotted are Mr. & Mrs. Elbert Carvel, Valliant Fertilizer Co., Laurel, Del., Ed Valliant, Valliant Fertilizer Co., Centreville, Md., L. A. Krebs, Baugh Chemical Co., Baltimore, Md., Dean Gidney, U. S. Potash Co., New York, Mrs. Ed Smith, Washington, Sid Keel, International Minerals & Chemical Corp., hiding behind dark glasses.



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Water-Soluble
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Magnesium is the basic metallic element in chlorophyll, the green plant substance which captures the sun's energy that is vital for life and growth.

Magnesium concentrates in the seed with phosphorus to aid in the formation of oils and proteins required for viable seed.

* Magnesium functions as a carrier of phosphates to the actively growing and fruiting parts of the plant.

Magnesium is required to activate the processes which stimulate the production and transport of carbohydrates and proteins within the growing plant.

Magnesium, in sufficient quantities, enables the plant to utilize other plant nutrients for healthy, disease-resistant growth.

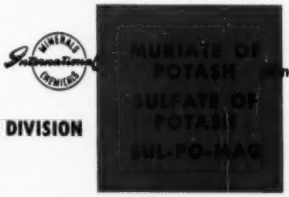
Magnesium stimulates the growth of soil bacteria and increases the nitrogen-fixing power of legumes.

Research has demonstrated that there is a close relationship between phosphorus and magnesium in the life and growth of all plants. Magnesium appears to act as a "carrier" of phosphates within the plant, probably by the formation of soluble magnesium phosphate compounds. Poor response to phosphate fertilizers may be due to low magnesium in the soil. Therefore, in order that the growing and fruiting parts of the plant receive sufficient supplies of phosphorus, they must have an ample amount of soluble magnesium in addition to phosphate.

The most effective and convenient way for the farmer to supply an adequate amount of soluble magnesium to his growing crops is to use a fertilizer containing *Sul-Po-Mag*.

Sul-Po-Mag, produced exclusively by *International*, provides a properly balanced combination of sulfate of magnesium and sulfate of potash, water-soluble and immediately available to the growing plant. *International* supplies *Sul-Po-Mag* in bulk for use in mixed fertilizers and bagged for direct application.

Advertising of *Sul-Po-Mag* in full-color pages in *Country Gentleman* and in smaller space in state and sectional farm papers is stimulating the interest of farmers in quality fertilizers containing *Sul-Po-Mag*.



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was a new thing, being gingerly approached by the more daring of the growers, Mr. Garst bought and gave hybrid seed-corn to his neighboring farmers. Today, with just as much enthusiasm, he is doing the same thing with a forward looking fertilization program.

As Mr. Garst said, he cannot understand anybody giving a thought to a possible loss of fertilizer volume. Out in Iowa they have "callouses on their knees from begging for more fertilizer" and if all the farmers could be educated to the point the leaders have reached the industry would find itself hard put to supply the fertilizer needed by Jefferson County, alone.

Mr. Garst made a survey, and found that farmers were not going short on fertilizer due to the refusal of banks to make loans, but due to the fact that not enough farmers looked on plant food programs as something to justify such loans. There is, he says, no shortage of funds for the farmer who can present an intelligent plan for the development of his land. And he believes those who complain of fund shortages are largely the substandard farmers, who are not good risks for institutions which are the custodians of other people's money.

Bankers, he reports, are going much further. They are hiring men who really know farming, and teaching them banking. Through these men they are helping the farmer to lay out a program which may even eliminate the need for borrowing. He spoke of farmers with unprofitable cattle—or at least cattle which produced less revenue than their value of fertilizer would bring up out of the ground. He cited examples of milk cows sold, the money put into fertilizer—and the crop resulting in revenue many times that of the milk.

Farmers need to be shown, says Mr. Garst—and wonders why our industry's salesmen are not out

KEY TO PICTURES

1. Mr. & Mrs. T. W. Allen, Sand Mountain Fertilizer Co., Atallia, Ala. **2.** Mr. & Mrs. W. D. Barton, Tennessee Corp., Atlanta, Ga. **3.** Mr. & Mrs. Bob Engle, National Fertilizer Association, Inc., Washington. **4.** Mr. & Mrs. E. A. Geoghegan and Miss Patty Geoghegan, Southern Cotton Oil Co., New Orleans. **5.** Miss Dixie Lee Phillips, Mr. & Mrs. R. W. Phillips, Chemical Engineering Service, Green Bay, Wisc. **6.** Mr. & Mrs. J. H. Owens, Roanoke Guano Co., Roanoke, Ala. **7.** Mr. & Mrs. R. A. Jones, Anaconda Copper Co., Anaconda, Mont. **8.** Dr. & Mrs. J. K. Plummer, Tennessee Corp., Atlanta, Ga. **9.** Mary Wallace Nelson, National Fertilizer Association, Washington, Ray Pratt, Kinchen O'Keefe & Co., Greenville, Miss. **10.** Mr. & Mrs. Henry K. Lange, and Miss Dena Lange, Lange Bros., Inc., St. Louis, Mo. **11.** Mr. & Mrs. Ed Smith, Potash Company of America, Washington. **12** Mrs. George Moyers, Chicago, Ill., Gera Piero, S. E. I.F.A. Viale Regina, Italy, George Moyers, International Minerals & Chemical Corp., Chicago, Ill. **13.** Roy Gurkin, Fulton Bag & Cotton Mills, Raleigh, N. C., Mrs. J. O'H. Sanders, Atlanta, Ga., J. D. Dawson, Fidelity Chemical Corp., Houston, Tex. **14.** Mr. & Mrs. M. D. Broadfield, Ark. Farmers Plant Food Co., N. Little Rock. **15.** Mrs. R. W. Turner, Council Bluffs, Iowa, Mrs. R. E. Bennett, Omaha Farm Fertilizers, Omaha, Neb., Mrs. H. E. Woods, Columbus, Ohio.

1. Dr. H. B. Mann, Washington, Dr. Fielding Reed, Atlanta, both of American Potash Institute, Dr. Russell Coleman, National Fertilizer Association, Washington, James A. Naftel, Pacific Coast Borax Co., Auburn, Ala. **2.** C. D. Shallenberger, Shreveport Fertilizer Works, Shreveport, La., John Looper, Dalton, Ga. **3.** W. J. Chapin, Norfolk, Va., W. H. Parker, Greensboro, N. C. both of Swift & Co., J. J. Devlin, Southwest Potash Corp., New York, S. M. Sherrill both of A. F. Miller, Swift & Co., Chicago, Ill. **4.** C. B. Clay, Naco Fertilizer Co., H. V. B. Smith, and Wm. English, Jr., both of New York, J. E. Henderson, Jr., Savannah, all of H. J. Baker & Bro. **5.** John Suggs, Werthan Bag Corp., Nashville, Tenn., Bob Linderman, International Minerals & Chemical Corp., Atlanta, Ga., John Hall, Potash Co. of America, Washington. **6.** T. E. Bradley, Potash Co. of America, Peoria, Ill., Nelson White, Smith Agricultural Chemical Co., Columbus, Ohio. **7.** Mr. & Mrs. G. D. Glover, French Potash & Import Co., New York. **8.** Ray King, Georgia Fertilizer Co., Valdosta, Ga., E. S. Russell, Old Deerfield Fertilizer Co., S. Deerfield, Mass., M. S. Hodgson, Empire State Chemical Co., Athens, Ga. **9.** H. B. Fultz, Hector Supply Co., Miami, Fla.

there shaking hands across farm fences in the off-seasons, encouraging test plots. Because if a man can demonstrate a better crop on his own land, it is far more convincing than a test plot off somewhere else. He wonders at the dealers who have no selling program, and told of one in his area who considered direct, farm-to-farm salesmanship a secret weapon, and begged the bank not to tell the other dealers what was going on.

He razzed the agronomic forces in a humorous way for their varying stories, and felt that much progress could be made if these approaches to the various problems could be reconciled, and the farmer not confused by finding his farm-paper and his county agent and his university diametrically opposed in their theories and their recommendations.

"Get on the same wave-length with the farmer", says Mr. Garst, by which he means that too much of the information relayed to the farm comes down in language he does not understand. He advocated a course in public relations and the study of books on how to make your hearers and readers understand what you say. Because, said he, "Unless they understand you, you might just as well not have thought the thoughts."

It was a long, hard job to sell the hybrid corn idea. It is equally hard to sell the full fertilizer idea—and it will take the combined, integrated effort of our industry working closely with the whole extension program to accomplish the task. Only 15% really want to know. Another 10% are exposed to education . . . how to educate the remaining 75% is the problem which faces us if we are to go on expanding and developing our industry as we would like to do.

His final word—keep prices high enough so there is an incentive to get out and sell. "Keeping everlastingly at it brings success."

Then came Willard M. Fifield, director of Florida's experiment stations—a man with a dry wit, and his feet firmly on the ground—something which he says is sometimes a bit rare among agronomists. His talk was a review of the type of activities of the unusual AES setup heads. They have some 200 in personnel, only half of which are at home base, the remainder being scattered out through the state on stations and projects. He can quote chapter and verse on the money the extension forces have saved and made for the Florida growers, the work they have done in the development of such things as, for example, the phosphate resources of the State. And he can talk in broad strokes as well.

"Americans don't mind working hard. But they want to do it their own way, and not be told by anyone how they must do it."

"There are people in this world who are starving to death. Let us be thankful next Thursday that we are not among them. And let us give credit to the great Land-Grant College system that has made us the best-fed nation in the world. War, disease and starvation are mankind's worst enemies, and the greatest of these is starvation."

He entered into the realm of the future, discussing the ground swell of demand for full soil analysis, and the matching of fertilizers to soil needs more closely. He recognized this as creating production and distribution problems for the fertilizer industry, but was full of faith that we could work it out, as we had worked out so many other problems. In the interest of better utilization of plant food, the time is not too far off when fertilizer analyses will not only take into consideration the inherent plant food in the soil, but the results of tissue and leaf analyses which are coming into the picture.

Thursday afternoon a Symposium on Ammoniation Technology was held, under the chairmanship of George V. Taylor of Spencer Chemical. He presented four speakers:

T. C. Rogers of the Nitrogen Division (Allied Chemical & Dye) spoke on the ammoniation of normal superphosphate, and laid the background of the whole development of ammoniation which is now approaching what seems to be its practical top limit, and the mechanical condition problem ammoniation has imposed.

He emphasized the vital need for bring equipment up to date so that the mass could be uniformly and properly ammoniated, because, once fixed, no amount of mixing can redistribute ragged ammoniation.

Good ammoniation requires uniform superphosphate (or recognition of its variation; good mechanical condition, proper ammoniation practices; proper aeration and cooling.

This talk brought out several audience questions: Will water added permit higher ammoniation? Yes, but it must be removed afterward in the drying-cooling process.

A question on cooling brought out considerable description of cooling equipment.

A question on the use of wetting agents developed the fact that tests, now inconclusive, do show some value in the use of such agents when the mass tends to resist ammoniation.

Joe C. Sharp of Spencer Chemical spoke on the ammoniate of triple superphosphate which does not absorb ammoniation like normal superphosphate. In cold weather it will refuse. Ammoniation up to 3.25%, fairly simple. Up to 5% is being accomplished, but is far more difficult. Mr. Sharp presented a series of slides showing the costs of production, based on a mid-West point so the shipping costs would be included.

Ove F. Jensen, DuPont, spoke on urea-ammonia solutions, a complex subject. He discussed the properties of various urea-ammonia liquors, the type of equipment required, and the safety measures which should be taken in any plant using these liquors.

W. E. Schaffnit, Stedman Foundry and Machine Company, talked on ammoniation equipment and techniques. He made the point that our industry has ceased to be a mechanical producer and is now a chemical industry.

He emphasized the vital need for accurate weights. He says entirely too much stress is laid on high-speed mixing. "Not how fast, but how well" is the thing to ask, he says.

Be sure all ingredients are in the mass before mixing. Time in the mixer must be higher as we get into the higher ammoniation rates . . . as much as 3 minutes for some levels.

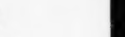
And he described in detail many types of mixing equipment.

Thursday night, the annual banquet took the form of a buffet supper, served with all the drama for which the Roney-Plaza chefs are famous. Afterwards an hour-long show, displaying the real talents of a group of local beauty queens, and dancing, completed the evening.

Friday morning Safety took the lead, with W. N. Watmough, Jr., Davison Chemical vice-president, presenting the top management viewpoint on the economic and social values of a real safety program. Our readers are familiar with the record of Davison in this respect, and the high honors they have won from the National Safety Council as well as from insurance companies due to their remarkable record of safety.

Mr. Watmough presented the subject from the viewpoint of the worker who suffers the pain and the financial loss of the accident; the community that must help somehow to pay for that loss; the industry itself, which loses a good man: and the plant which gains a reputation as a bad place to work, if its safety record is bad, in a period when labor can be choosy.

And, as final event the following:



KEY TO PICTURES

1. Mr. & Mrs. W. T. Doyle, Sturtevant Mill Co., Boston, Mass. **2.** Mrs. Doug Kelly, El Dorado, Ark., J. C. Cabe, Farmers Fertilizer Co., Texarkana, Ark., Mrs. Harold Trammell, Texarkana. **3.** Mr. & Mrs. Fred Purcell, Combustion Engineering — Raymond Pulverizer Div., Atlanta, Ga. **4.** Mr. & Mrs. W. S. Tyler, Red Star Fertilizer Co., Sulphur Springs, Tex. **5.** Mr. & Mrs. Harold Trammell, Farmers Fertilizer Co., Texarkana, Tex. **6.** Al Weldon, Lee Turner, International Paper Co., Baltimore, Md. **7.** Tom Athey, Albemarle Paper Mfg. Co., Richmond, Va., Marion Field, Meridian Fertilizer Factory, Hattiesburg, Miss., F. N. Bridgers, Farmers Cotton Co., Wilson, N. C. **8.** George McCarty, Ashcraft-Wilkinson Co., J. O'H. Sanders Fulton Bag & Cotton Mills, both of Atlanta, Ga. **9.** B. A. Crady, U. S. Potash Co., Meridian, Miss. **10.** Thos. H Tremearne, USDA, PMA, OMF, Malcolm McVicker, National Fertilizer Association, Washington. **11.** B. F. Crumpler, Raleigh, N. C., F. R. Curtis, Shreveport, La., both of Chilean Nitrate Sales Corp. **12.** Dr. H. B. Mann, Washington, D. C., Dr. Fielding Reed, Atlanta, both of American Potash Institute. **13.** Ed Kapusta and Bob Engle, both of National Fertilizer Association, Washington. **14.** C. B. Dunn, French Potash & Import Co., New York, J. H. Epting, Epting Distributing Co., Leesville, S. C. **15.** H. M. Arnold, Arnold Fertilizer Co., Monroe, Ga., Shorty Maddox, Southwest Potash Corp., Atlanta, Ga., Hoke McConnell, McConnell & Co., Royston, Ga.

NEW FOUNDATIONS FOR TOMORROW'S AGRICULTURE

By Dr. A. H. Moseman
Chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA

I welcome this opportunity to meet with you today. For a good many years the fertilizer industry has maintained a lively interest in Federal-State crop and soils research. In turn, my associates in agriculture have recognized that the production and use of fertilizers are an essential part of improving crop production which is the goal of our research. We share many common problems in our efforts to improve processes and products, to develop higher analysis fertilizers, to devise better methods of application, and to increase the efficiency of crop use of nutrients.

In your meetings yesterday and today you have given considerable attention to problems of direct concern to the fertilizer industry. I should like to review with you some of the problems and potentialities of mutual concern to all of us in agriculture and particularly in agricultural research. We are all familiar with the challenge facing our farmers in meeting the requirements of a growing population in the years ahead. What will be needed in the way of new information to meet these demands?

Technology in agriculture has come a long way in the past 10 years. We've made so much progress that some folks say we already have the technology necessary to feed a population one-fourth larger than we are feeding today at levels of nutrition equal to those now established. The main concern, in their opinion, is to apply the recommendations we already have. It has been suggested also that increased use of fertilizer alone will take care of most of our food and fiber needs over the next 25 years.

Expanded use of fertilizers will help and is important. As you know, the Department of Agriculture has recently joined with the Land-Grant Colleges in setting up a comprehensive program to encourage more efficient use of fertilizer and lime. This will be a vital factor in helping farmers meet food demands in the future. Used effectively, fertilizer and lime will produce high crop yields, build up the soil, and pay the farmer an adequate return on his investment.

COORDINATED ADVANCES IN TECHNOLOGY

But here is what we must keep in mind. Effective use of larger amounts of fertilizer will require a highly-geared technology in the

whole cropping system. We must have—in some cases—a completely new approach to crops and soils problems. We must have improvements not only in fertilizers, but also better adapted varieties of crop plants, with improved practices for controlling weeds, plant diseases, and insects, better machinery for applying both fertilizers and pesticides, improvements in cultivating and harvesting equipment, and more efficient use of our water resources.

Our success in making efficient use of fertilizer and lime will depend almost entirely on our ability to gear all aspects of crop production and soil management, including conservation measures, to a higher level of efficiency. This will require a more adequate understanding of the laws and principles governing plant growth and development, and the orderly application of such knowledge in modification of growth processes. This background or basic information represents the new foundations for tomorrow's agriculture which I want to touch on today.

TOBACCO PRODUCTION

Let's take a look at the tobacco crop as an example of a few of the intermeshed problems. Over the past half century, tobacco culture in the United States has been stabilized and intensified in those regions most favored by soil and climate for its production. We apply more fertilizer per acre to tobacco than to any other field crop. Returns in both yields and quality are generally very good.

Even so, tobacco growers are still plagued by many difficult problems of production that can't be solved simply be the use of more fertilizer. Plant diseases carry a special threat to the tobacco grower. For example, a year ago in North Carolina, black shank—one of the more serious and widely prevalent diseases — completely destroyed the crop on 15 thousand acres. A detailed survey assessed the cost at seven-and-a-half million dollars. Unless we can find —through research—effective methods of disease control, tobacco growers will not be needing additional fertilizer.

With tobacco as with other crops, our approach to the disease problem has been to breed resistant varieties. Today's varieties, while much improved over those of 35 years ago, are far from the final answer to all that is desired with regard to quality and resistance to diseases.

The limitation—we realized 25 years ago—is that all of the cultivated tobaccos come from one species and this species is highly susceptible to many diseases. No matter how much we arranged the genes in the material we could never achieve the high degree of resistance we need.

And so, we began to search for new material to use in the breeding work. Plant explorers combed the world for wilt-resistant tobaccos. When these plants were evaluated we found some tobacco relatives that carried high resistance or immunity to the major tobacco diseases. But they were of different species and we had to devise techniques for making interspecific crosses. To do so we first had to develop a better understanding of the fundamental genetics and heredity of the tobacco plant. The urgency of the disease problem—with the only apparently satisfactory answer resting in interspecific crosses—made us undertake the long-time basic studies needed to gain this understanding.

We're beginning to see returns from the fundamental research begun in 1930. We now have techniques for making interspecific hybrids to transfer resistance to a high level in new varieties. Today we have the experience necessary to map a breeding program that will give us resistance to most and possibly all of the now known major diseases of tobacco. The job was well done for tobacco and has been carried on in a similar manner for some other crops. However, our knowledge of the genetics of disease resistance and the nature of resistance in plants is still meager and woefully inadequate for combating our multitudinous hazards of crop disease.

TOBACCO QUALITY

Another problem has been raised by the introduction of resistant tobacco varieties and by increased use of fertilizer. That is the question of quality. Most of the disease-resistant varieties have different quality characteristics that the susceptible tobaccos they replaced. Unbalanced or excessive fertilization also produces tobacco unacceptable to the trade because of excessive moisture content, off flavor, coarse leaf, or at times tobaccos that cannot be properly cured. In a highly competitive world market quality is extremely important. The United States now has the quality edge in this market and we must keep it to hold our place in the world tobacco trade.

A few years ago we initiated studies to develop understanding of the factors involved in tobacco quality. We wanted some basic physical and chemical standards to replace the "touch or taste" practices. As a result, we now have a new technique —the chromatographic method—by which we can—for the first time—separate the alkaloids in the tobacco leaf. This has opened a wide range of vistas to be explored. One of these is the influence of different alkaloids on tobacco quality. Another is the alkaloid composition of a large collection of tobacco breeding material. A third is a clearer understanding of the relationship between fertilizer use and tobacco quality.

Here again, the quality relationship is not peculiar to the tobacco crop. We are all familiar with the influence of fertilizers and higher yields on protein content of wheat and corn.

Recent studies indicate the cost of tobacco fertilizer can be reduced from 20 to 35 percent without affecting either the quality or the yield of the crop adversely. This can be done by substituting low cost inorganic materials for the more expensive organics now used, increasing the total plant nutrient content, and changing the relative proportions of major nutrients. Some prog-

D-K CO.

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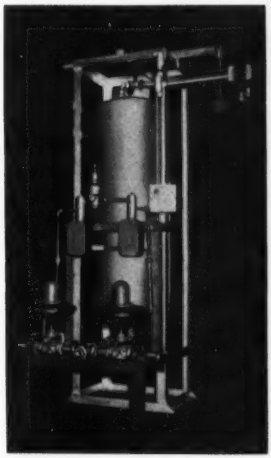
The Auto-Nitrogen Solution Tank



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ress has already been made in getting these recommendations adopted.

The tobacco crop is grown in a relatively small area of this country and a great deal of research has been done on many factors of production. Some of the problems, now solved in tobacco culture, remain important hurdles in other crop areas.

TESTS FOR NATIVE PHOSPHORUS

For example, on acid soils, we've be able for many years with reasonable accuracy to measure the native and applied phosphorus available to plants. We have no reliable tests for native phosphorus in the calcareous and neutral soils of the West. However, this particular problem seems well on the way to being solved. We have developed a highly promising laboratory technique that appears suitable for making simple, rapid tests for native phosphorus fertility in Western soils. As soon as this is perfected we will be able to define the broad areas where added phosphorus is needed for crop production.

NUTRIENT DEFICIENCIES

Much of our research must be directed toward obtaining more knowledge of the inter-relationships between crops and fertilizers, soils, and water. A timely example is a study we're initiating in the South. The object is to find how soon the use of fertilizers containing little or no sulfur may result in sulfur deficiency. This investigation will relate the sulfur brought down in the rainfall and the residual sulfur in the soil to crop requirements. We must have more information on the amount of sulfur collected in the atmosphere around industrial cities and carried by rainfall to farm land. We must consider the cropping system, and its effect upon the rates of sulfur needed by different crops.

We've gained considerable insight into certain aspects of plant nutrition in the past few years. The work with radioisotopes has given us an unusually sharp and detailed picture of the role of phosphorus in plant growth, the relation between native and applied phosphorus, and the stages at which different crops make maximum use of this element. We need similar information on nitrogen, potassium, and other nutrient elements.

A new concept for determining copper deficiency in plants has recently been proposed by a scientist of our Bureau. He suggests that an enzyme activity—the ascorbic acid oxidase—is a more accurate gauge than the measurement of the copper itself. Results of a number of tests support his concept. It opens up a promising new clue to solving this important problem.

As you know, a tremendous amount of work has been done in plant nutrition. And yet there are many gaps in our knowledge, even for crops on which we've done the most work.

We know a great deal about the nutrition of the corn plant . . . probably more than for any other crop. But we are not yet able to get maximum benefits from high soil fertility on our better hybrids. Although high fertility corn culture has come into the picture only since World War II, it is already beginning to raise new questions on plant nutrition. We know heavy applications of nitrogen will lead to an imbalance of other elements.

We are obtaining increasing evidence that some of the nutrition problems may be solved by breeding. We know, for example, that some inbred lines of corn are particularly sensitive to fluctuations of available magnesium. Others are less sensitive. We will need to know much more about the nutrition responses of our individual inbred lines before we can make the best use of them. This relates not only to their response to nutrient elements but also to chemicals applied for control of weeds and insects. All of these interactions must be given consideration in the building of a permanent, high-fertility corn culture.

SUPPLEMENTAL IRRIGATION

Farmers in the humid areas who invest heavily in seed, fertilizer, ma-

6 NEW PLANTS NOW UNDER CONSTRUCTION

These brilliant performers of advanced Sackett design will, upon completion, have a combined annual production capacity of well over 300,000 tons.

Each of these highly mechanized new manufacturing facilities adds further tangible proof to our long-recognized leadership in this particular field.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.

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chinery, and pesticides, are growing less willing to risk the chance of drought. An increasing number of them are installing supplemental irrigation. We know quite a bit about the engineering aspects of supplemental irrigation . . . the storage, transfer and application of water. But we know very little about the agronomic relationships of how to use water to get the most efficient returns from fertilizer. To what extent will supplemental irrigation encourage disease? We don't know precisely when and how much water to apply to different crops and soils. To find these answers we need to attack the problem on a broad front. We need the thinking of the soil physicist with engineering competence, the soil chemist with knowledge in fertilizers, and crop scientists in several fields.

Another possibility for improving fertility-soil moisture relationships in the East lies in deeper rooting of crop plants. Wheat, legumes and other crops that send roots down to 6 feet in Western Plains seldom penetrate more than 2 or 3 feet in the heavy soils of the East. On most irrigated soils of the West alfalfa has roots 6 to 10 feet deep. But we have observed a vigorous stand of alfalfa on Cecil Clay in South Carolina which was drawing moisture only 3½ feet. One solution to this problem may be the deeper placement of lime and fertilizers, but we do not have the facts or experimental evidence necessary for formulating recommendations.

SEED QUALITIES

Still another approach to soil-moisture-crop relationships is through improved seed characteristics. In the Northern Great Plains we are studying the seed of native and adapted grasses. There is increasing evidence that strains of certain grasses differ in seed qualities related to germination, seedling vigor and early growth that is necessary for grasses to establish themselves readily. Some native grasses have disappeared because they were poor seed producers. Others have unusually long periods of dormancy. For example, Indian rice grass increases in ability to germinate up to seven years. The question is whether we can work out treatments to break such dormancy.

SOIL FERTILITY AND STRUCTURE

Another facet of the soil moisture-fertility relationship is showing up on the Great Plains. Since the turn of the century when this land was first cropped, research attention has been focused on water conservation and use. Low rainfall has been the principal factor limiting crop production in the dry land areas. But, recent experiments show that losses in soil nitrogen and soil organic matter now exceed from 30 to 50 percent and this decline of soil fertility has become a major problem. We have yet to develop economic practices for arresting it. We are not able to prescribe the best combinations of water, soil, and crop management that will maintain or improve productivity in these declining soils.

Our knowledge of what constitutes good soil structure is far from complete. For many farm implement people have asked what are the requirements of a good seedbed. We know the undersirable extremes—the coarse cloddy soil on the one hand, the impermeable compaction on the other. But what about the wide range of soil aggregation between these extremes? It is possible that there are optimums for different root environments. We've been unable to answer these questions because it has been impossible to hold the soil in a stable state long enough to study the various physical factors—aeration, moisture, temperature, and mechanical impedence or resistance. These vary among themselves and are continually changing through the season.

In some of the new soil conditioners we have—for the first time—an unusually effective tool for studying soil structure. Our Bureau participated in the initial field evaluation of some of these materials. Already they have provided us with valuable new insight into how soil structure influences soil-water and other relationships. Our studies indicate that the materials hold unusual potentials for improving the top 6 inches of the soil. We're studying the problem of how to mix them in the soil. We're attempting to determine what types of available tillage implements will do the job most efficiently.

The possible long-range agricultural benefits from the new compounds are intriguing. But the potentials can be realized only by intensive studies. We must know a great deal more about the mechanism and reaction of the compounds in various soils. We need comprehensive studies of changes in soil moisture and soil air supply produced by conditioners and the effects of these changes on crops. Preliminary evidence shows that some of the materials are very good. Others are less effective and still

KEY TO PICTURES

1. Al Baker, Bradley & Baker, Inc., New York. Rav Ellis, Ellis Chemical Co., New Albany, Ind. 2. Moultrie Clement, Merchants Fertilizer & Phos. Co., Pensacola, Fla., Harold Bryant, Phillips Chemical Co., Tampa. 3. J. E. Hall, Jr., Soperton Guano Co., Soperton, Ga., W. W. LaRoche, U. S. Steel Co., Fairfield, Ala., Rucker McCarty, International Minerals & Chemical Corp., Atlanta, Ga. 4. Borden Chronister, Hopewell, Va., George Suggs, New York and Ed Harvey, New York, Malcolm Hunter, Richmond, Va., all of Nitrogen Division, Allied Chemical & Dye Corp. 5. John C. Mooar, Sturtevant Mill Co., Atlanta, Ga., R. D. Johnson, Marietta Concrete Corp., Marietta, Ohio. 6. Frank Littlefield, Mente & Co., Inc., Savannah, Ga., A. D. Kincaid, Southern Cotton Oil Co., Columbia, S. C. 7. M. C. Jones, Florida-Georgia Tractor Co., Jacksonville, Dudley Bennett. 8. W. J. Chapin, Norfolk, Va., W. H. Parker, Greensboro, N. C., and A. L. Wiley, Atlanta, Ga., all of Swift & Co. 9. Chas. Mittleman, Kraft Bag Corp., New York, V. J. Leahy, Baugh Chemical Co., Baltimore, Md. 10. Earl Gettinger, Woodward & Dickerson, Inc., Philadelphia, E. G. Crockett, Chas. Page & Co., Inc., New York. 11. S. L. Nevins, Little Rock, Ark., and Arch Carpenter, Baltimore, Md., both of Mathieson Chemical Corp., Ira E. Moss, Shreveport Fertilizer Works, Shreveport, La. 12. A. H. Sterne, Tennessee Corp., Atlanta, Ga., G. F. Moore, U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla., Morton Hodgson, Empire State Chemical Co., Athens, Ga. 13. Chas. F. Martin, Miami Fertilizer Co., Dayton, Ohio, Joe Culpepper, Spencer Chemical Co., Kansas City, Mo., C. R. Martin, Miami Fertilizer Co., Dayton, Ohio, R. E. Bennett, Farm Fertilizer, Omaha, Neb. 14. Warren Huff, Ashcraft-Wilkinson Co., Columbus, Ohio. 15. Frank Greeley, Fulton Bag & Cotton Mills, New Orleans, La., A. D. Kincaid, Southern Cotton Oil Co., Columbia, S. C., J. H. Epting, Epting Distributing Co., Leesville, S. C., C. J. Cahill, Rath Packing Co., Waterloo, Iowa.















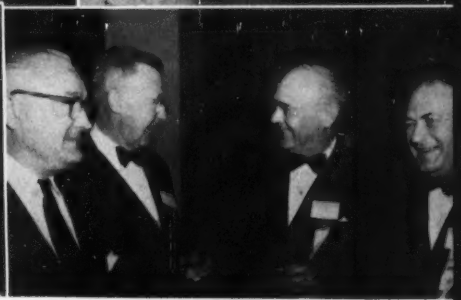

CUSTOMERS

H-C (HIGH-COUNT) COTTON

BEMIS DRESS PRINT AND WHITE COTTON

Albert A. Green, President of Jackson Fertilizer Co., Jackson Miss., says:

"We have been highly pleased this year with the pretty white high-count sheeting bags you have supplied us. Our customers like them very much and they were delighted to have these bags with the band-labels that are easy to remove.

We were also pleased with the strength of these high-count sheeting bags as we have had very little trouble with torn bags."

☆ ☆ ☆

T. W. Allen, President of Sand Mountain Fertilizer Company, of Attalla, Alabama, says:

"Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store."

☆ ☆ ☆

E. T. Spidle, General Manager of the Capital Fertilizer Company, Montgomery, Alabama, says:

"These bags proved to be very satisfactory and we expect to use them again next season."

Ask your Bemis Man for the whole story about Bemis H-C Dress Print Bags

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Bemis Dress Print Fertilizer Bags Provide Garments for the Entire Family!

New York Designs Wind Up in Alabama Style Show

Mr. Dallas Greer, who uses Mountain Brand Fertilizer on his farm, poses with his wife and daughter . . . all three are wearing garments made from Bemis H-C print patterns. Pleased customers like the Greers help get still more customers for Mountain Brand.

The experience reported by Mr. T. W. Allen, president of the Sand Mountain Fertilizer Company, of Attalla, Alabama, is typical. He gave a trial-size order for Bemis H-C Dress Print Bags for the well-known Mountain Brand Fertilizer. Sales results were so good that *within three weeks he placed three more orders . . . all very large ones.*

Now, Mr. Allen says, "Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store. And those New York-designed Bemis prints certainly please the women."

Bemis

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others are almost worthless. None of them are "cure-alls."

The interest of the American public in these new conditioners has demonstrated again that the value of a product does not have to be established to insure its acceptance.

HERBICIDES

We had a similar experience with chemical weed killers. Although only a preliminary research had been completed when they were first placed on the market, the public accepted them immediately. New products have been introduced at an increasing tempo.

Today's progressive farmer—and his number is increasing—watches over our shoulder while we try new materials in the field plots. His quick acceptance of promising new methods creates a pressure and places responsibility on both the agency doing the basic research and the industry that sells the commercial product. Both need more time for thoroughly testing the materials and practices.

We have appreciably expanded our research in herbicides. But we still cannot keep up with the demands for information. Fortunately, so far the benefits of these powerful chemicals have far outweighed their damage. At the same time some serious losses have occurred. This past year throughout the South growers had to replant cotton that had been treated with pre-emergence sprays. These had been recommended as the best available on the basis of limited tests by our Bureau, the State Agricultural Experiment Stations, and some of the chemical companies. Our information was not as complete as we would have preferred. But labor was scarce, heavy losses from weeds threatened the crop, and so growers assumed the possible risk of injury from chemical sprays. The losses of stands were the result of a combination of factors—low seedling vigor, disease, and weather. And some of the crop damage was caused by the weed killers.

On the bright side of the picture, many encouraging new findings are coming out of the weed research. We're working closely with the chemical industry in our search for more effective compounds. The Department of Defense and the National Research Council are also supplying us with chemicals for this study. The results have already given us a much better understanding of the relation between chemical structure and toxicity to plants.

In one instance we've found the herbicidal activity of a family of compounds—the carbamate derivatives—depends on the arrangement of various atoms on the benzene ring. By adding a chlorine to the number 3 position on the ring, we produce a compound that kills germinating crabgrass. When we add other atoms at other positions, we can produce compounds that also kill mustard and pigweed. In greenhouse experiments, the compounds have caused little or no damage to cotton, the crop in which these weeds generally cause trouble. This is the kind of information we must have if we ever intend to write the proper prescriptions for chemicals that are truly selective in their herbicidal action and can be used with full confidence by farmers.

Our Federal-State cooperative research program is conducting fundamental work on active ingredients and is evaluating weed killing chemicals. Each firm then makes its own formulations. However, important variations are showing up in the different materials. You in the fertilizer industry can appreciate some of the difficulties that are arising. We believe it is the responsibility of each manufacturer to know the properties of the solvents, co-solvents, wetting and sticking agents, and to know specifically how these influence the properties of the active ingredient in relation to the crop plant. This essential production control helps to maintain confidence in the recommendations of research agencies, and to build good will and sales for industry.

FERTILIZER TECHNOLOGY

In comparison with the organic compounds that make up today's spectacular new pesticides, the chemicals in fertilizer are relatively simple to study. But the answers don't always come easily. You know how to make high-analysis fertilizers. But there is still need for satisfactory methods of granulation. We still don't have the physical conditioning we need for the best handling, storage, and application of high-analysis fertilizers. We are keenly aware of the difficulties in formulation, compounding, and processing that we face as we increase the concentration of plant nutrients or introduce new materials. A great deal needs to be done in adapting fertilizers to specific soils and crops. We recognize the research job ahead that must be done if farmers are to be provided with improved fertilizers at low unit costs.

We must continually keep in mind that the successful use of fertilizers is closely tied in with new knowledge of soil types and management practices. Advances in fertilizer re-

KEY TO PICTURES

1. Mr. & Mrs. James E. Totman, Summers Fertilizer Co., Baltimore, Md. 2. Mr. & Mrs. J. P. Brinton, Hydrocarbon Products, Inc., New York, S. N. Bradley, Union Bag & Paper Corp., New York, Rucker McCarty, International Minerals & Chem. Corp., Atlanta, Ga. 3. Mr. & Mrs. Leroy Donald, Lion Oil Co., El Dorado, Ark., Mr. & Mrs. C. R. Martin, Miami Fertilizer Co., Dayton, Ohio. 4. Mr. & Mrs. Paul Clute, Agricultural Products Co., La Cruces, N. M. 5. Mrs. Tom Davies, Columbia, M. Tegtmeyer, New York, Mrs. Tegtmeyer, Tom Davies, all of Synthetic Nitrogen Products. 6. Mr. & Mrs. J. W. Dean, Knoxville Fertilizer Co., Knoxville, Tenn. 7. Mr. & Mrs. Clyde T. Marshall, Commercial Solvents Corp., New York, W. R. Allstetter, National Fertilizer Association, Washington. 8. Mr. & Mrs. J. P. Cox, Wheeler Fertilizer Co., J. L. Baskin, International Minerals & Chemical Corp., all of Orlando, Fla., Mrs. Moultrie Clement, Pensacola, Fla. 9. Mr. & Mrs. B. E. Brown, Knoxville Fertilizer Co., Knoxville, Tenn., John Sanders, Spencer Chemical Corp., Atlanta, Ga. 10. Mr. & Mrs. W. W. Coffin, Link-Belt Co., Chicago, Ill. 11. Mr. & Mrs. R. A. Oliphant, Victor Fertilizer Co., Chester, S. C., Tom Davies, Synthetic Nitrogen Products Corp., Columbia, S. C., Mr. & Mrs. Less Myers, Victor Fertilizer Co., Chester. 12. Mr. & Mrs. E. S. Russell, Old Deerfield Fertilizer Co., S. Deerfield, Mass. 13. Dr. & Mrs. J. M. Bellows, Hector Supply Co., Miami, Fla., Mr. & Mrs. Adrian Jacobs. 14. Mr. & Mrs. Norwood Lockett, Foremost Fertilizer Co., Leesburg, Fla., Mr. & Mrs. J. P. Cox, Wheeler Fertilizer Co., Orlando, Fla. 15. Arthur Smith, Mathieson Chemical Corp., Baltimore, Mr. & Mrs. L. G. Porter, USDA, Washington.















search will rest in part upon concurrent improvements in crop varieties, pest control practices, and new knowledge of the complex plant, soil, and water relationships. While we must have research in progress at all stages of development, we must devote more time and effort to the basic studies that may appear to have little or no immediate application. This is our long-time investment in the future.

RECOGNITION OF RESEARCH

We're beginning to see an increasing recognition of the need for more and better research in agriculture. The industry advisory committees, representatives of growers' associations and other agricultural groups are giving more attention both to work now under way and to research that is needed. The President-elect has indicated an awareness of the problem. In his speech at Memphis during the campaign, General Eisenhower pointed to the relative support for research in agriculture and in other segments of the economy. I am sure we all agree that our farmers should not be left with a horse and buggy agriculture in their competition for efficiency with other industries in this jet-propelled age.

The job is not alone for Federal, State, and other public agencies. A part of the load should and is being increasingly carried by the industries directly allied with agriculture. Our Bureau is developing more and more cooperation with industry groups. Our relationships with the research personnel of cooperating private companies are both wholesome and progressive.

In lining up the research programs ahead we must consider not only the amount but also the kind of research we support. I think I can best illustrate my point by comparing research to the profile we use in soil classification. As most of you know, the profile is a vertical section of soil extending from the top layer down through the parent material to the underlying stratum. We can speak of the applied phase of research as the "A" horizon in the profile. It is the top soil. Many of yesterday's research problems have been solved by relatively simple, straight forward, and fairly obvious methods. We have cultivated the plowed layer or "A" horizon intensively. Its potential for production has been reduced. It will not be adequate for future requirements. So we must dig more deeply. We must gain a far better understanding of the "C" horizon. This is the unconsolidated material from which soil can be formed only by slow complex processes. In terms of basic research this is the material out of which we will formulate new concepts, find new clues that will lead to far greater productivity than we have known before. This is the goal of basic research in building our future foundation. By a prudent combination of basic and applied research we can keep our heads in clear air and our feet in fertile soil.

MULTIPLE SHOT BLASTING

The Fertilizer Group at the National Safety Congress in October devoted considerable discussion to multiple shot blasting in fertilizer storage. Mark Withey of Trojan Powder Company conducted much of the discussion and demonstrated the technique at the Chicago plant of International Minerals and Chemicals. This paper will, we feel, prove of great value to many of our readers, because it is a practical answer to a general problem.

By MARK WITHEY
Trojan Powder Company

Late in 1950, Mr. U. C. Ellis, General Superintendent of Swift and Company, Plant Food Division, invited us together with other manufacturers to look over his operation and offer suggestions to reduce the hazards connected with breaking up bulk super-phosphate and fertilizer prior to removal for further processing.

A survey was made of a number of fertilizer plants and it was found that super-phosphate is usually stored in continuous piles approximately 35 ft. to 45 ft. high by nearly 80 ft. wide in large buildings while fertilizers are stored in bins approximately 20 ft. high by 20 ft. wide, also in large structures, the bins being separated by wooded book-shelf bulkheads. It was common practice to break down these piles of bulk materials by single hole blasts. The blast holes were bored into the piles at various heights to a depth of approximately 5 ft. by means of a sampling auger. The bore holes which were approximately 5 inches in diameter, were loaded with a concentrated charge or bomb consisting of from four to eight cartridges of 1¼ x 8-20% strength dynamite and stemmed with chunks of the material to be blasted.

Detonation of each concentrated charges had the effect of breaking up the fertilizer in the immediate vicinity of the charge but caused little displacement in the upper portions of the pile. Consequently after the broken material had been mucked up, the piles were often left with dangerous overhangs under which it was necessary to prepare the next cycle of drilling, blasting and mucking. These overhangs became more pronounced and more dangerous as the working face advanced into the pile. In addition, the concentrated charges often caused damage to floors, walls and bulkheads.

The ideal working face, for materials of the type we are considering, would be one where the face sloped back from the bottom to the pile at an angle closely representing the normal angle of repose. Such ideal conditions can seldom be maintained by single hole blasting. In order to approach this condition, it is necessary to shake up and displace the working face in a single blast to a greater depth, and for the entire height of the pile. This involves a greater mass of material and therefore requires greater energy and consequently a heavier charge of explosives.

In order to distribute this energy it is necessary that holes be drilled

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1. AMMONIUM SULFATE . . . Phillips *66* Ammonium Sulfate contains 21% N. Flows freely, resists caking.

2. AMMONIUM NITRATE . . . Phillips *66* Ammonium Nitrate contains 33% N. Small, coated, uniform pellets flow freely and resist caking.

3. ANHYDROUS AMMONIA . . . Phillips *66* Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.

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not only near the bottom of the pile, but also higher up in the face and sloping toward the crown of the pile. This requires longer holes of smaller diameter so that the explosive charge may be distributed more uniformally throughout the mass to be blasted, thereby eliminating the highly concentrated charge formerly used. It became apparent that holes 2 inches in diameter to accomodate 1¾ x 8 cartridges charged end to end would afford such distribution.

The number of holes required to displace the amount of material desired in a single blast would depend upon the height of the pile and the width of the bins. The use of more holes of greater depth permits the explosives to be charged in better relationship with the amount of material to be blasted, and so produce a better working pile and leave the face in a safer condition.

The practice had been to use low strength, low priced 20% dynamite in 1¼ x 8 cartridges. With better distribution afforded by the deeper, smaller diameter holes, it was felt that an explosive having much greater energy, liberated at a slower rate, and distributed over a greater length of the bore hole would produce the desired type of action. Such an explosive would have less local influence at any point in the pile and therfore cause less damage to walls, floors or bulkheads. Its greater heaving characteristics would permit the energy to spread further through the pile and thereby do much more effective work. The explosive we have recommended for this type of blasting is Trojatol No. 2 which is a bulky, high stick count, high gas volume explosive with a low rate of detonation that is relatively safe to friction, impact and flame. It is packed approximately 88-1-¾ x 8 cartridges per 50 pound case. Trojatol No. 2 will not produce headaches and does not detonate when subjected to the rifle bullet test. It is, however, a high explosive and must be afforded the care in storage and handling recommended for all high explosives.

The simultaneous detonation of the entire quantity of explosive required for a round of holes would be undesirable in the restricted confines of the bins and the structural housing. This however was overcome by employing a system of multiple hole fast delay blasting in which the charges are fired in rapid sequence. With this system it is possible to arrange the firing sequence of a round of holes, so that the first hole to fire will offer relief for the holes fired in the second period, which in turn relieve the holes fired in the third period, and so on. This method of firing not only makes it possible to reduce the thrust on walls and bulkheads but greatly reduces the total vibration set up by detonation of the entire round. In addition, multiple hole fast delay blasting produces better breakage and displacement than instantaneous firing. Multiple hole fast delay blasting has been in universal use in mines and quarries for at least seven years. The most economical manner to provide sequence firing in this type of blasting is by the use of fast delay electric blasting caps which are available in 15 periods with delays of approximately 25 milliseconds or 50 milliseconds between each period. Fast delay electric blasting caps may be connected in a single series circuit and fired by conventional blasting machines.

I will later attempt to illustrate visually, by means of light panels, the method of obtaining fast delay firing of multiple hole blasts, and, to some extent, the area of the piles affected by the detonation of each delay period.

With the cooperation of Mr. Ellis a system of multiple hole fast delay blasting was established and put into practice that was far superior to the old system of single hole blasting. Far more fertilizer or super-phosphate is brought down per pound of explosive. The material blasted contains less large lumps and is more easily handled. The working face is left in much safer condition and presents far less hazard to men and equipment. Since many more tons of material are brought down in one multiple hole blast than had been produced by the same number of holes fired singly, the number of blasts necessary have been greatly reduced.

Trial and practice have established that the width and height of the pile will determine the number of holes necessary per round, and, to some extent their depth. Most piles require two horizontal rows of holes, the bottom row drilled approximately 4 ft. above the floor, and the second row usually from 7 ft. to 9 ft. above floor. The holes in the lower row may be from 6 ft. to 10 ft. deep while those in the upper row may range from 10 ft. to 16 ft. deep. The upper, longer holes are sloped upward at an angle of approximately 25 degrees. This is important, because it is this row of holes that trims the crown and prevents overhangs. The holes may be spaced horizontally from 4 ft. to 8 ft. apart depending upon the distance between bulkheads and the depth of the holes. Holes should not be drilled closer than 4 ft. to bulk-

KEY TO ASA PICTURES

1. C. J. Willard, Dept. of Agronomy, Ohio State University, newly elected vice president, American Society of Agronomy. H. E. Myers, associate dean and director, Kansas Agric. Exp. Station, Manhattan, president, American Society of Agronomy. 2. New Officers, Crop Science Division American Society of Agronomy. H. L. Ahlgren, associate director of the Agric. Ext. Service, University of Wisconsin, Madison, H. R. Albrecht, Chairman Dept. of Agronomy, Pennsylvania State College, State College, Pa., Glenn W. Burton, Dept. of Agronomy, Agric. Exp. Station, Tifton, Ga. Ahlgren is new vice president; Albrecht is incoming president; and Burton is outgoing president. 3. Stevenson Award winners, American Society of Agronomy, receiving awards from President Myers. Left to right: H. E. Myers, president, American Society of Agronomy, Don Kirkham, Dept. Agronomy, Iowa State College, Ames, and R. Merton Love, Dept. of Agronomy, U. of Calif., Davis. 4. J. R. Taylor, Jr., Agronomist, American Plant Food Council, Washington: Glenn Black, representing the student agronomy club of Texas A & M College, chosen to receive the American Plant Food Council's award for the best agronomy club of 1952; Darrel Metcalfe, Dept. Agronomy, Iowa State College, Ames, chairman of the student section, Agronomic Education Division, American Society of Agronomy. 5. Winners of the 1952 student essay contest, sponsored jointly by the American Society of Agronomy and the American Potash Institute: Rutledge F. Ford (4th place) University of Arkansas, T. H. Johnston, chairman, student essay committee, Dept. of Agronomy, Oklahoma A & M College, Stillwater, Ben Rondal Fleming (6th place) Tennessee Polytechnic Institute, Thomas N. Denker, Jr., (1st place) Oklahoma A & M College, Jerry D. Eastin (3rd place), University of Nebraska, Robert H. Hass (2nd place) Oklahoma A & M. 6. Five newly chosen Fellows of the American Society of Agronomy (five others were not at the meeting). Left to right: F. N. Briggs, dean and director, Calif. College of Agriculture, Davis, W. R. Paden, head, Dept. of Agronomy, Clemson Agric. College, Clemson, S. C., S. S. Atwood, head Dept. Plant Breeding, Cornell University, Ithaca, R. W. Simonson, asst. chief, Div. Soil Survey, USDA, Beltsville, and J. R. Quimby, Texas Substation # 12, Chillicothe, Tex.

AT THE ASA MEETING

heads when the adjoining bins are filled, or closer than 5 ft. if they are empty. The upper holes should have a minimum of 7 ft. of material imposed over them. The average explosive ratio was found to be approximately one 1¾ x 8 cartridge of Trojatol No. 2 per 1.5 ft. of bore hole, or conversely seven-tenths cartridge per foot of hole.

Holes should always be file loaded, that is the cartridges should be charged end to end maintaing close contact with each cartridge. Precautions should be taken to prevent fine particles or small chunks of material to accumulate between cartridges during loading. All holes should be stemmed to the collar by means of tamping bags filled with fine fertilizer.

A fast delay electric blasting cap of the proper period should be inserted into a hole made in one end of a cartridge by means of a brass or copper priming awl so that the cap is entirely buried in the explosive, and be so fixed that it cannot be dislodged in charging or stemming. The primed cartridge should be located approximately in the center of the explosive column.

It is very important that every blaster have at his disposal good blasting wire, a standard No. 50 push down blasting machine and a blasting galvanometer, and that they be maintained in good condition.

We understand that temperatures as high as 90° Centigrade are experienced in piles of fertilizer. Therefore, it is strongly recommended, that all holes in a blast round be drilled and cleaned before any charging is begun. After charging has begun, there should be no interruption of the work until all of the holes have been charged, stemmed, connected and fired.

In conclusion I would like to briefly remind you of possible hazards in connection with blasting ammonium nitrate or fertilizers containing ammonium nitrate. I am not familiar with the manufacture or composition of fertilizers, but it is known, that at times nitrate of ammonia has been used as a nitrogen bearing ingredient. I suppose that all of you know that ammonium nitrate, and some mixtures of ammonium nitrate with other materials, may be detonated under certain conditions. Several serious accidents have been experienced, both in this country and abroad, while handling or transportaing ammonium nitrate and fertilizers containing ammonium nitrate. All of us remember the Texas City catastrophe several years ago. The most severe accident involving ammonium nitrate occurred September 21, 1921 at Oppau, Germany, when 10,000,000 pounds of an ammonium sulfate —ammonium nitrate fertilizer compostion detonated while being blasted to break up the caked material. It had been common practice for many years to break up such mixtures by blasting.

We therefore wish to caution all of you concerning the hazards involved in blasting ammonium nitrate or mixtures containing large proportions of ammonium nitrate. For additional information on this subject, I refer you to an excellent pamphlet published by the Manufacturing Chemists Association, Inc. titled "Fertilizer Grade Ammonium Nitrate", and Circular No. 719 issued by the United States Government titled, "Explosibility and Fire Hazard of Ammonium Nitrate Fertilizer".

- Safety -

PUNGENT PARAGRAPHS from a talk made in October before the Safety Engineering Club of Baltimore, by Marlin G. Geiger, Vice-Chairman of the Board, The Davison Chemical Corporation.

There are many reasons why top management should be interested in the safety program—I might say **every** reason. In the broadest sense safe operation is good public relations. It affects the relationship of the company not only to its employees but to the community at large. To be known as a **safe** place to work is a long step on the path of being known as a **good** place to work. To be sure, this helps to cut down labor turnover and win for the company the better, more solid and reliable type of employee. But the implications are much wider because in these days, more than ever, it is an obligation of a company to be a good citizen, a good member of the community, interested in the well-being and health not only of its employees but of all the people in the area in which it operates.

A safe plant is one with good housekeeping, which makes for efficiency, for low costs, and for quality products, all benefits well worth striving for. Show me a plant with bad housekeeping and I will show you a plant with a bad safety record. Good housekeeping is an essential of a good safety program.

Inevitably in any safety program the analysis of causes of accidents ranks high among essential activities.

Backing up of safety men extends to granting them veto power over projects that are the responsibilities of other departments—even of top management itself. When there is planning of new plants, new processes, new methods, new machinery, new structures and alterations and additions to existing structures there is close scrutiny of them from the safety point of view. Detection of a health or accident hazard will send the plans back to the initiating department for further study and work.

By such means and many others that go into details which I am sure you do not wish to hear about from me, the Davison safety record has been accumulated. In 1950 we won 35 safety awards from four important organizations. Among them, granted to the corporation as a whole, including its Phosphate Rock

Mining Division in Florida, was the Natonal Safety Council's "Distinguished Service to Safety Award." This was the first time in the long history of this distinguished organization that this award was made to a corporation nearly half of whose man hours are employed in the manufacture of fertilizer.

The best safety engineers in the world are helpless without the backing of what is often called "the brass" but which in safety matters may be just "the lead."

About two-thirds of industrial accidents take place in plants employing less than 100 persons. I am sure that is due to the lack of properly staffed safety programs, expertly administered.

Screw Feed Now Used For Bulk Materials

The screw feed used in coal stokers has been adapted and is proving highly successful as a larger scale automatic conveyor made by Canton Stoker Corporation, Andrew Place S. W., Canton, Ohio. Called "Flo-Tubes", the cast iron trough is bolted together in sections, capped with steel plates removable for inspection, and inserted in bottom of bin or pile with end left exposed for pick-up. Flo-Tube on an incline fills one hopper directly or two hoppers by a Y chute arrangement at the top end. Horizontally a single Flo-Tube using gate valves will feed two, three or a battery of hoppers. High and low levels in hoppers are maintained by "off-on" switches automatically starting and stopping the screw feed.

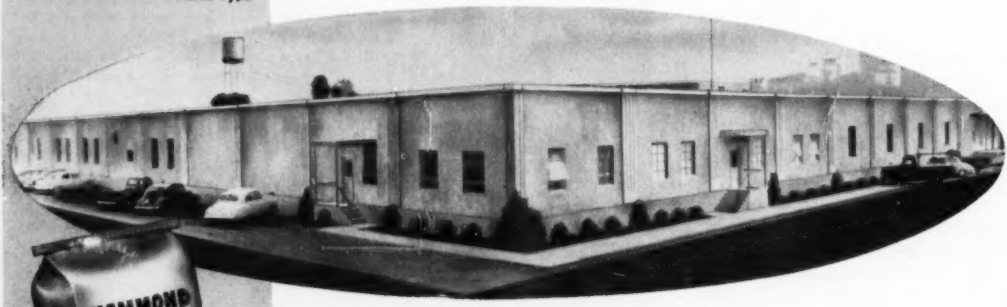
Range of sizes offered convey up to 10,000 lbs. of coal per hour. This represents quite a savings in manpower, for shoveling can be eliminated almost completely if bin bottom is slanted to feed exposed entry end of Flo-Tube by gravity. Noteworthy is reduction in personnel turnover where installations are made—as work is made easier and operators have time for more exacting duties.

Apart from coal, much interest is being expressed for handling of bulk materials such as grain, pellets, flakes, seed, chips, and fertilizer.

Pasted Valve Type

Now...

A BIG NEW PLANT



Sewn Valve Type

Open Mouth Pasted Bottom

Open Mouth Sewn Bottom

for better, more dependable delivery of

HAMMOND *Multi-Wall* BAGS

To serve our customers better in the Midwest and Southwest, Hammond has built a big, modern plant in Pine Bluff, Arkansas. Exclusively devoted to the manufacture of Multi-Wall bags, this plant is equipped with multi-color printing presses and high speed modern machinery assuring economical and efficient operation. For you, our customers, this means superior quality and better service.

The Pine Bluff plant is located on two trunk line railroads and in addition has excellent facilities for shipment by truck assuring our customers in the Midwest better delivery service.

For Multi-Wall bags, "make it a habit to depend on Hammond."

HAMMOND BAG & PAPER COMPANY

General Offices: Wellsburg, W. Va.

Plants in Wellsburg, W. Va. and Pine Bluff, Ark.

Representatives in the following cities: CHICAGO, ILL. • BLUEFIELD, VA. • CHARLOTTE, N. C. KANSAS CITY, MO. • MINNEAPOLIS, MINN. • LIGONIER, PA. • WASHINGTON, D. C. NEW YORK, N. Y. • COLUMBUS, OHIO • HOUSTON, TEXAS

MARKETS

Organics: The fertilizer organic market is rather quiet with producers of Domestic Nitrogenous Tankage in a heavily solid position although limited supplies for fall and spring Nitrogenous Tankage are available. Prices range from $4.55 to $5.00 per unit of Ammonia, bulk, f.o.b. shipping point. Imported Nitrogenous is offered in limited quantity at around $6.15 per unit of Ammonia, bagged, CIF Atlantic port for late fall shipment.

Castor Pomace: Supplies of Domestic Castor Pomace are limited and one producer is sold up for the balance of 1952. Current price is $37.25 per ton in burlap bags/paper bags, seller's option, f.o.b. North Eastern production point with $2.00 per ton allowance if shipment is made in paper bags. Imported material ranges in price from $40.00 to $45.00 per ton CIF Atlantic ports.

Dried Blood: Unground bulk dried Blood is indicated at $7.50 to $7.25 per unit of Ammonia f.o.b. Chicago area. The New York market ranges in price from $7.00 to $7.25 per unit.

Potash: Movement against contracts for Muriate of Potash is steady. No changes in prices have been announced and current price is 43c per unit, bulk for 60% Muriate, f.o.b. Carlsbad, New Mexico. This price is subject to seasonal discount. Imported Muriate is available at prices equal to and, in some cases, slighlty under the cost of Domestic Muriate at port destinations.

Ground Cotton Bur Ash: This excellent source of Potash, primarily in the form of Carbonate of Potash, is available for prompt and future shipment at prices approximating the delivered cost of Domestic Sulphate of Potash. Current production tests 38% to 42% K20.

Phosphate Rock: The market is firm and supplies of high grade particularly, are fairly tight. Domestic demand is steady. Prices are firm.

Superphosphate: Production continues at high level. Demand is taking available supplies at ceiling levels. Triple Superphosphate is in greater demand than supply. Current price at Tampa is 91c per unit, bulk, f.o.b. Tampa.

Sulphate of Ammonia: Demand continues strong, maintaining the market in tight position with shipments being made directly from production. No change in prices is noted. Imported material varies in price from $53.00 to $55.00 per ton, f.o.b. cars Atlantic ports.

Ammonium Nitrate: Although production is at peak levels demand is taking up all available supplies and the market is extremely tight. Current prices are $72.50 per ton f.o.b. Port Robinson, Ontario, $64.00 f.o.b. Eldorado, Arkansas and Military, Kansas and $64.80 f.o.b. Etter, Texas, bagged material.

Nitrate of Soda: Supplies of imported material continue adequate and there has been no change in the prices of either Domestic or Imported material.

Imported Calcium Ammonium Nitrate: This form of Ammonium Nitrate of which approximately 40% is Lime and testing 20/21% Nitrogen, is available from several importers for fall and spring shipment at $51.25 per ton in 100 lb. paper bags, f.o.b. cars at the ports.

OCTOBER AND NOVEMBER REPORTS

FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS
(In Thousands of Equivalent Short Tons)
Compiled by The National Fertilizer Association

STATE	August		July		Jan-July		Apr-May-June	
	1952	1951	1952	1951	1952	1951	1952	1951
Virginia	—	—	—	—	—	—	331	288
N. Carolina	—	—	12	11	1,596	1,458	691	515
S. Carolina	24	22	10	8	753	687	200	152
Georgia	10	10	30	11	1,132	1,029	694	295
Florida	45	37	59	53	725	708	134	281
Alabama	—	—	50	35	924	898	358	477
Tennessee	15	9	16	32	466	423	310	257
Arkansas	8	7	18	9	312	360	196	216
Louisiana	11	9	8	9	249	243	101	86
Texas	20	15	20	13	399	359	139	130
Oklahoma	—	—	6	3	116	92	48	31
TOTAL SOUTH	133	109	229	184	6,672	6,257	3,202	2,728
Indiana	73	86	95	75	648	526	202	177
Missouri	99	58	65	33	539	480	201	162
TOTAL MIDWEST	172	144	160	108	1,187	1,006	403	339
California	—	—	—	—	—	—	229	213
TOTAL OTHER	—	—	—	—	—	—	229	213
GRAND TOTAL	305	253	389	292	7,859	7,263	3,834	3,280

	September		August		Jan.-Aug.		Jul.-Aug.-Sep.		July-August	
	1952	1951	1952	1951	1952	1951	1952	1951	1952-53	1951-52
Virginia	—	—	—	—	—	—	90	91	—	—
N. Carolina	—	—	26	27	1,622	1,485	—	—	38	38
S. Carolina	50	41	24	22	776	709	84	71	34	30
Georgia	29	32	10	10	1,142	1,039	69	53	40	21
Florida	97	62	45	37	770	745	201	152	104	90
Alabama	—	—	30	18	954	916	—	82	80	53
Tennessee	36	32	15	9	481	433	67	73	31	41
Arkansas	9	6	8	7	320	368	35	22	26	17
Louisiana	18	11	11	9	261	253	38	29	20	18
Texas	54	51	20	15	419	373	95	79	41	27
Oklahoma	—	—	19	12	135	104	—	—	25	15
TOTAL SOUTH	293	235	208	166	6,880	6,425	679	652	439	350
Indiana	82	36	73	86	721	612	250	197	168	161
Missouri	88	77	99	58	638	538	251	167	164	91
TOTAL MIDWEST	170	113	172	144	1,359	1,150	501	364	332	252
California	—	—	—	—	—	—	—	—	—	—
TOTAL OTHER	—	—	—	—	—	—	—	—	—	—
GRAND TOTAL	463	348	380	310	8,239	7,575	1,180	1,016	771	602

23rd Consecutive Annual Survey
APPROXIMATE CONSUMPTION OF LIMING MATERIALS ON UNITED STATES FARMS DURING 1951
by National Lime Association, Washington 5, D. C.

State (1)	Agricultural Limestone (2) (Tons)	Burned Lime (Tons)	Hydrated Lime (Tons)	Marl (Tons)	Miscellaneous Materials (3) (Tons)	Total Liming Materials (Tons)	Lime Oxides (4) (Tons)	Lbs. of Lime Oxides per Acre of: Crop Land (5)	Crop Land & Pasture (5)
Maine	57,500	--	3,500	--	--	61,000	31,200	52.6	14.3
New Hampshire	34,800	--	200	--	--	35,000	17,540	100.5	78.0
Vermont	83,000	500	500	--	--	84,000	42,290	90.2	73.2
Massachusetts	59,000	--	3,000	--	--	62,000	31,600	133.6	101.3
Rhode Island	12,500	--	500	--	--	13,000	6,600	340.0	169.0
Connecticut	53,500	--	2,500	--	--	56,000	28,500	154.5	114.5
New York	800,000	--	15,000	25,000	--	840,000	420,500	121.8	99.1
New Jersey	124,000	12,000	24,000	--	6,000	166,000	91,760	197.3	168.2
Pennsylvania	1,140,000	29,000	66,000	11,000	7,000	1,253,000	648,920	189.9	163.4
NORTHEAST	2,364,300	41,500	115,200	36,000	13,000	2,570,000	1,318,910	146.2	121.4
Delaware	50,000	7,000	5,000	--	5,000	67,000	36,660	158.4	137.0
Maryland	200,000	47,000	20,500	26,000	12,500	306,000	171,110	186.2	149.7
West Virginia	180,000	9,000	3,000	30,000	10,000	232,000	116,020	148.1	98.6
Virginia	750,000	17,000	6,000	75,000	15,000	863,000	430,160	203.6	148.6
North Carolina	528,000	500	2,000	--	9,500	540,000	269,640	77.4	70.0
Kentucky	970,000	--	--	15,000	10,000	995,000	494,250	156.0	85.2
Tennessee	600,000	6,000	5,000	--	30,000	641,000	320,780	90.8	64.7
EAST CENTRAL	3,278,000	86,500	41,500	146,000	92,000	3,644,000	1,838,620	129.2	91.5
Ohio	2,038,000	2,000	23,000	3,000	78,000	2,144,000	1,069,110	188.7	159.8
Indiana	2,402,000	--	12,000	120,000	2,000	2,536,000	1,252,200	212.7	181.1
Michigan	380,000	--	--	170,000	18,000	568,000	286,700	126.4	84.9
Illinois	3,800,000	--	--	--	--	3,800,000	1,900,000	178.0	158.7
Wisconsin	1,800,000	--	6,000	10,000	20,000	1,836,000	915,700	170.9	141.9
Minnesota	390,000	--	--	3,000	2,000	395,000	196,850	18.8	17.5
Iowa	3,025,000	--	--	--	--	3,025,000	1,512,500	132.1	116.1
Missouri	2,550,000	--	--	--	200,000	2,750,000	1,355,000	367.8	302.1
NORTH CENTRAL	16,385,000	2,000	41,000	306,000	320,000	17,054,000	8,458,060	153.2	132.6
South Carolina	149,000	--	--	--	--	149,000	74,500	30.5	27.7
Georgia	428,000	1,000	--	--	8,000	437,000	218,080	47.3	41.6
Florida	305,000	--	1,000	--	7,000	313,000	156,000	131.0	94.0
Alabama	190,000	--	--	--	19,000	209,000	102,600	28.8	23.5
Mississippi	180,000	--	--	--	175,000	355,000	160,000	43.4	35.7
Louisiana	97,000	--	--	--	26,000	123,000	58,900	30.6	20.8
Arkansas	265,000	--	--	--	--	265,000	132,500	36.9	27.4
Oklahoma	365,000	--	--	--	--	365,000	182,500	26.6	22.8
Texas	102,000	--	--	--	--	102,000	51,000	3.3	2.7
SOUTHERN	2,081,000	1,000	1,000	--	235,000	2,318,000	1,136,080	26.1	21.4
Kansas	813,000	--	--	--	--	813,000	406,500	29.1	27.6
Nebraska	50,000	--	--	--	--	50,000	25,000	2.2	2.1
Wyoming	--	--	--	--	4,000	4,000	1,600	1.4	1.2
Washington	23,000	--	--	--	3,000	26,000	12,700	3.6	3.3
Oregon	85,000	--	1,000	--	1,000	87,000	43,600	19.1	15.7
California	10,000	7,000	2,000	--	--	19,000	12,560	2.5	1.8
WESTERN	981,000	7,000	3,000	--	8,000	999,000	501,960	13.5	12.1
GRAND TOTALS	25,089,300	138,000	201,700	488,000	668,000	26,585,000	13,253,630	83.3	70.0

23rd ANNUAL LIME MATERIALS SURVEY

The 23rd annual survey of the "Approximate Consumption of Liming Materials on United States Farms During 1951" by the National Lime Association, shows that for the country as a whole, 1951 proved to be about the same as 1950 with a total consumption of liming materials of 26,585,000 tons, representing an infinitesimal increase of about 500,000 tons over 1950.

Sectionally, there was a substantial gain in the South of about 25%. The Western section also reflected an increase of about 14%, and the Northeast enjoyed a slight gain of approximately 5%. Losses occurred in the two biggest lime consuming sections, the East Central and North Central areas, of approximately 3%.

The most pronounced consumption gain occurred in Arkansas, about 126%. However, the greatest tonnage increase, 324,000 tons, occurred in Ohio. Florida, Georgia, Texas, Nebraska, New York, and Kansas all showed sizable increases.

On the debit side, the biggest tonnage losses occurred in Illinois and Missouri. However, Illinois still held its position as the leading state for liming in spite of an increase by second place Iowa. South Carolina and North Carolina both had marked decreases. Smaller losses occurred in Vermont, New Jersey, West Virginia, and Tennessee.

Lime Table Footnotes

(1) States not listed use little or no liming materials. Sources of statistics shown: (a) Production & Marketing Adm., U.S.D.A.; (b) Agricultural Experiment Stations; (c) State Extension Services; (d) State departments of Agriculture; (e) County Agent Surveys; (f) Producers Surveys; (g) Farm Census.

(2) Includes all ground and pulvedized forms of limestone (screenings, coarse and fine types) which are used for direct application to the soil. Also includes limestone used in fertilizer mixtures.

(3) Consists of ground mollusk and egg shells, paper and sugar mill refuse, slag, lead mine chats, water softening sludge, and carbide refuse.

(4) Computed on the following basis: 50% for agricultural limestone; 88% for burned lime; 70% for hydrated lime; 40% for commercial marl and miscellaneous materials; and 35% for farm-dug marl.

(5) Cropland acreage consists of cropland harvested, crop failure, idle or fallow land. Pasture acreage consists of pasture land plowed within 7 years (1950 Census).

FERTILIZER IAC LIME RECOMMENDATIONS

The USDA-Land Grant College Fertilizer Steering Committee at a meeting in Washington November 13 heard a report from an advisory group representing the fertilizer industry. The report contained several suggestions for carrying out the recently announced National Program for More Efficient Use of Fertilizer and Lime. The objectives of that program are to encourage the more efficient use of fertilizer and lime to increase food and fiber production, build up the productivity of the soil, and to increase net returns to farmers.

Among the suggestions submitted by the advisory group are these:

(1) Efforts to obtain participation by the fertilizer industry should be organized at a State level with the Land-Grant Colleges and Universities taking the lead.

(2) A meeting of members of the fertilizer industry with the Land-Grant colleges should be arranged in each State in an effort to get industry cooperation in putting the National fertilizer and lime use program into effect.

(3) Steps should be taken as soon as possible to set up an advisory committee of farm equipment manufacturers to help assure that the development of fertilizer distribution machinery will keep up with progrom objectives.

(4) Demonstrations and contests should be used more widely as a

(Continued on page 76)

AT THE NFA CONVENTION: 1. J. R. Harding, Peoples' Fertilizer Co., Foley, Ala., M. Tegtmeyer, Synthetic Nitrogen Products Corp., New York, Maurice Lockwood, International Minerals & Chemical Corp., Chicago. 2. Morton Hodgson, Empire State Chemical Co., Athens, Ga. Mr. & Mrs. Hoke McConnell, McConnell & Co., Royston, Ga., and H. M. Arnold, Arnold's Fertilizer Co., Monroe, Ga. 3. Mr. & Mrs. A. W. Noland, Mr. & Mrs. Gedge Gayle, all of Kelly-Webber & Co., Lake Charles, La. 4. Mr. & Mrs. Warren Garst, Home State Bank, Jefferson, Iowa, Mrs. Roswell Garst, Coon Rapids, Iowa, Paul Soule, Jr., Grand River Chemical Co., Pryor, Okla., Chas. Walton, Chemical Construction Corp., New York. 5. Dick Adair, Adair & McCarty, Atlanta, Ga., Gaines Boynton, International Minerals & Chemical Corp., Atlanta, Ga. 6. Jim Weldon, St. Regis Sales Corp., Atlanta, Ga., Mrs. Moultrie Clement, Pensacola, Fla., A. F. Store, St. Regis Sales Corp., Baltimore, Md., Moultrie Clement, Merchants Fertilizer & Phos. Co., Pensacola, H. C. Petersen, Jr., St. Regis Sales Corp., New York.






Personals . . .

MEN PROMINENT IN THE NEWS

1. George W. Moyers, who has been elected vice president in charge of the International Minerals & Chemical phosphate division, to fill the vacancy created by the resignation of Franklin Farley. 2. Hans Stauffer, who has become executive vice-president of Stauffer Chemical. The rest are Bemis Bro. Bag Co. men: 3. Judson Bemis, director of central operations. 4. H. J. Wehrenbrecht, director of Southern operations. 5. O. M. Smith, who succeeds Judson Bemis as Minneapolis manager. V. H. Watts, who succeeds Mr. Wehrenbrecht as manager of the New Orleans plant and sales division.

R. L. Hockley has been elected president of **Davison Chemical,** of which his father, **C. F. Hockley** is chairman. In 1933 the elder Hockley assumed direction of the old Davison Chemical Company as receiver and the son joined him in 1934. During the subsequent years, while young Hockley was moving up step by step from engineering to sales to management the sales of the company have grown from $7,000,000 to $50,000,000 a year.

* * *

Dr. Myers F. Gribbins has been promoted to nitrogen products manager at **DuPont's** polychemicals sales office in Chicago, following the promotion of the former head of that department, **Francis M. Jornlin** to be assistant section manager in the Wilmington headquarters. Split off from Chicago, a new San Francisco office will shortly be opened to handle that area, with **Marion N. Crady,** promoted from West Coast sales representative, in charge. All three are long-time DuPont men: Jornlin, 1942; Dr. Gribbins, 1934; Crady, 1934.

* * *

Charles B. White, formerly with **Nitrogen Division,** has joined **Naco** as manager of the Los Angeles branch.

* * *

Phillip O. Cagne has joined **Nitrogen Division** to fill the spot vacated by **Charles R. White.**

* * *

V. C. Irvine has been moved by **Shell Chemical** from New York to succeed **George W. Huldrum Jr.** as Western division sales manager. Mr.

W. F. Nesbit, who has been made sales manager of Arkell and Smiths. He was formerly a Southern division sales representative in the Texas area.

Robert W. Drury, Jr., now on Albermarle Paper multiwall bag sales in Kansas, Missouri and eastern Colorado. Not shown, Jeff M. Johnson has the Iowa-Nebraska territory.

R. W. Schramm, who has been transferred to New York by Spencer Chemical as staff specialist in the development department. He has been with Spencer since 1949.

weigh all the facts before you build a

Extensive research and investigation of all the facts are necessary to make the building of a fertilizer plant economically sound. Where is the plant to be located? What is its proximity to supply? To distribution? How seasonal are demands in the plant area? What basic ingredients will be used more often? What return can be expected on the capital investment? These and many other facts must be considered in order to produce a sound enduring investment.

Many years of experience in the fertilizer industry have made Harte engineers congnizant of the over-all picture of fertilizer plant design, realizing that certain fundamentals must be followed while specializing the design of each plant. All possible facts are studied and adapted to fit each individual fertilizer plant.

The invaluable experience of Harte engineers is available to aid you in your fertilizer plant design. If you plan to build a fertilizer mixing plant, or an associated plant, the Harte organization of specialists can handle your complete job or any part from original design to an operating plant . . . assuring economy and speed.

Harte Engineers will be glad to discuss your plans with you, without obligation. Write today.

ENGINEERS

CONSTRUCTION MANAGERS

John J. Harte Co.

284 Techwood Drive, N.W., ATLANTA • NEW YORK • HOUSTON • MEXICO, D. F.

Huldrum has become Eastern division sales manager.

* * *

C. A. Paulson at Memphis and **A. L. Wigger** in Atlanta are two new sales division heads recently appointed by **Pittsburgh Agricultural Chemical.**

* * *

Ralph Farnham has become Southern promotion manager and **James F. Floyd** is a salesman in the Orlando district for **Chase Bag Co.** Mr. Farnham was manager of the Orlando branch and Mr. Floyd was Orlando office manager.

* * *

Dr. William A. Albrecht, chairman, department of soils, **University of Missouri,** was the principal speaker before the **Farmers' Club of Cincinnati** November 19. His topic was "Soils and Health." Dr. Albrecht is the author of many scientific and popular articles on soils and soil fertility, emphasizing the need of proper soil treatment to insure healthy plants and peoples and stressing the relation of soil fertility to human nutrition.

* * *

Bud E. Simonton has been appointed Superintendent of the Toledo factory of the **Chase Bag Company. F. H. Ludington, Jr.,** asst. vice president, announced recently

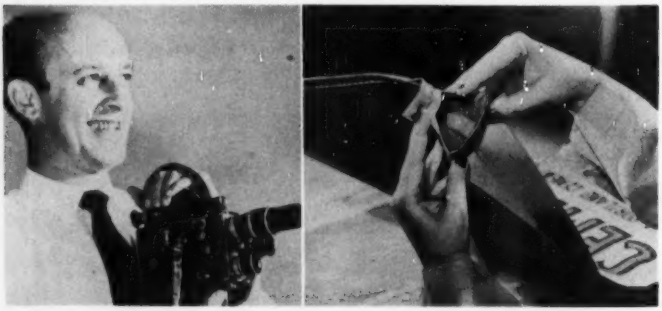
Mr. Simonton was formerly associated with the **Union Bag Company,** and more recently served as superintendent of several bag plants for **St. Regis. John F. Hilarski,** asst. supt., will assist Mr. Simonton and continue to be responsible for the textile bag operation at Toledo.

* * *

J. D. Stewart, Jr., Executive Vice-President of the **Federal Chemical Company,** Louisville, Kentucky, was re-elected President of the **Middle West Soil Improvement Committee** for 1953 at their annual business meeting in Chicago. The Middle West Soil Improvement Committee was formed in 1939 and is dedicated to the education and advancement of the Mid-Western farmer. It is supported by the fertilizer industry of which 50 companies are active members.

John W. Pearsall, prominent Richmond, Virginia attorney, who heads the newly created legal department in the general offices of Virginia-Carolina Chemical.

S. W. Franklin, Merchandising Director of Hudson Pulp and Paper Corp., the man behind the camera and the man behind the script of the new motion picture, "From Pines to Multiwall Sacks," which takes the viewer through each step of Multiwall Sack Making. Above we see a still from the film showing just one of the numerous methods for checking all details of the finished sacks. Running time is 33 minutes. Reserve this film for your own use, no obligation, of course, by writing: Film Lending Library, Hudson Pulp and Paper Corp., 505 Park Avenue, New York 22, N. Y.



The Duriron Company, Inc. announces the following personnel changes which became effective November 5, 1952. **Richard Schermer** has been named managed of pump Sales. He joined them in January, 1952, having served from 1945 as Eastern district manager for **Hills-McCanna Company. R. A. Prosser** becomes manager of building equipment sales. He has been Chicago district manager since 1945. **Wendell A. Watkins** has been promoted to Chicago district manager from Buffalo, and is succeeded by **D. E. Christie** who becomes manager of the Buffalo sales territory.

* * *

W. S. Munro, chief chemical engineer of **Monsanto's** Western division since 1947, has been named manager of the company's Seattle plant. He came to Monsanto in 1944 along with **I. F. Laucks, Inc.,** for whom he had been a chemical engineer since 1941. Before that, he was a chemist for **Standard Oil Company** at Richmond, California, and in 1935 won a Bachelor of Science degree in chemical engineering at the University of Washington.

* * *

Dr. Richard S. Davidson has joined the administrative staff of **Battelle Institute,** Columbus, Ohio. According to Battelle Director **Clyde Williams,** Dr. Davidson will coordinate relations between Battelle and its sponsors of agricultural and biological research. Until recently he was a member of the faculty at the Alabama Polytechnic Institute, Auburn, Alabama, and is the author of numerous papers based upon his work in plant pathology at both the Ohio Agracultural Experiment Station at Wooster and the Rhode Island Agricultural Experiment Station at Kingston.

* * *

Margaret Herbst, public relations counsel, as a consultant in public relations activities concerning Krilium soil conditioner and other products handled by **Monsanto Chemical Company's** Merchandising Division was announced November 18.

Miss Herbst's activities in the horticultural field will be concentrated primarily in the Eastern U. S.

A WHOLE FARM THRIVES ON NOURISHMENT

It's nourishment that makes little-ones into big-ones. And on the farm this applies to all living things . . . poultry . . . grain . . . man himself.

The soil is the basic source of all nourishment, yielding the vital plant-food elements upon which growth depends. These rich ingredients drained from the land must be replenished to satisfy the demands made upon the soil.

Many of the most effective soil-replenishing fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. Potash supplies nourishment to soil and crops, builds resistance to drought and diseases.

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 48/52% K_2O
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

USDA DISCUSSES GRANULATION

FOUR STAGES OF OPERATION DESCRIBED AND RESEARCH NEEDS INDICATED

Consumer demand for granular fertilizer has steadily increased where farmers have had the opportunity to observe its better physical condition in comparison with non-granular products. The improvement in physical condition is reflected by lower caking tendency, less dusting loss, and greater ease with which uniform distribution may be accomplished in the field. Granulation of mixtures appears to be the nearest approach to a solution of the conditioning problem.

At present there is no generally accepted definition of particle-size limits that accurately classifies a fertilizer as granular. Manufacturing convenience and the attainment of improved physical condition govern the particle size rather than a consideration of the most efficient size of particle for crop production.

Effects of Research

Research by the fertilizer industry and the U. S. Department of Agriculture has stimulated much interest in the development of commercial processes for granulation of a wide variety of fertilizer materials and mixtures. This discussion is confined to a generally accepted process of granulating mixed fertilizers by agglomeration. Commercial development of the process has progressed much more rapidly in the United Kingdom than in the United States. More than 75 per cent of the annual production of mixtures in the U. K. is now in granular form. At least 20 mixing plants in the U. S. have been converted either in part or entirety to the granulation procedure and a number of others are in the advanced stages of granulation development.

By Bureau of Plant Industry, Soils and Agricultural Engineering, USDA, Beltsville, Maryland, in NFA's "Process Progress".

Ammoniation of mixtures as practiced in the United States, and which furnishes economical forms of nitrogen along with some conditioning effect, is not practiced in the United Kingdom owing to the fact that phosphate guarantees are based on water-soluble rather than on available P_2O_5. Highly soluble salts, such as urea and ammonium nitrate, commonly used in American mixtures, are seldom present in mixtures produced in the U. K. These differences in formulation of mixtures naturally give rise to differences in granulation procedure and introduce problems of manufacture in this country that are not encountered in British manufacture. However, recent observation of plant operations in England and Scotland reveals many features of the granulation procedure that are common to both methods of formulation.

The accompanying flow-diagram, Figure 1, represents a process for granulating mixed fertilizers which, in general, is applicable to both systems of formulation. The process may be divided into **4 distinct stages** of operation, namely; **(1) Mixing and grinding, (2) Wetting and agglomerating, (3) Drying,** and **(4) Cooling and sizing.**

Mixing and Grinding

In the **first stage** of the process the mixing and grinding of initial materials contribute to the uniformity with which plant nutrients are incorporated in the final granule. Fine grinding of the initial mixture aids in preventing the formation of oversize nodules in later stages of the process and thus decreases the proportion of the mixture that must be reprocessed. Consequently the degree of fineness of the initial mixture represents an economic balance between the cost of grinding and the cost of reprocessing any oversize produced. In many cases, only that portion of the initial mixture which is retained on a screen of ⅜-inch mesh is subjected to the grinding operation. Equipment and procedure for this stage of the process are essentially the same as for the production of non-granular mixtures.

Wetting and Agglomerating

The **second stage** of the process involves wetting and agitating the mixture to cause the formation of agglomerates, and then further agitating or cascading to compact the agglomerates into firm, dense granules. There is considerable leeway for modification of this stage of the process to adapt it to various methods of formulation. Mixtures formulated without ammonia, or without highly soluble salts such as ammonium nitrate and urea, require the addition of water to an overall moisture content of 12 to 20 percent to cause granulation; the formation of granules occures at virtually atmospheric temperature and external heat is necessary to dry the product. On the other hand, ammoniated mixtures containing relatively large amounts of highly soluble salts require little or no added water. Granulation occurs at a moisture content of 6 to 10 percent and the heat of the ammoniation reaction is often sufficient to dry the granular product without the use of any external heat.

Within certain limits the amount of heat from chemical reaction may be adjusted to that necessary to drive off excess moisture by adjusting the amount of ammonia used in neutralizing the free acid and acid

salts present in the fertilizer mixture. As compared with procedures not involving the use of ammoniating solutions, the use of such solutions gives rise in freshly prepared mixtures to relatively greater liquid-phase volumes per unit volume of water, not only because salts of greater solubility are included in the formula but also because the increase in temperature resulting from ammoniation further increase the relative amount of material in solution. Under these conditions the process requires somewhat more rigid control with respect to time, temperature, and volume of liquid phase in the material than when moisture alone is the controlling factor. Plants in the United States, taking advantage of the heat of ammoniation and high volume of liquid phase to cause agglomeration at low moisture content, employ the customary types of ammoniating equipment used in producing non-granular mixed fertilizers.

The Eirich, pan-type, batch mixer has been used extensively in the United Kingdom for agglomerating non-ammoniated mixtures. The pan and mixing blades, which are eccentric to the pan, rotate in opposite directions and maintain the charge in a constant state of agitation while water is being added to cause agglomeration. Another type of granulator, widely used for continuous processing of either ammoniated or non-ammoniated mixtures is the rotary cylinder. A typical rotary cylinder is 6.5 ft. in diameter and 18 ft. long. It is inclined at 2° from the horizontal and rotates at 8 r.p.m. When additional moisture is necessary to cause agglomeration, the operator stationed at the discharge end, controls the continuous addition of water to the material at the inlet end on the basis of appearance of the moist granules as they approach the outlet end of the cylinder. An important advantage of continuous over batch-wise equipment is that a uniform rate of flow of material to the drier is maintained without the use of smoothing hoppers or similar apparatus between the agglomerating and drying-stages of the process. Smoothing hoppers and screw conveyors are not adapted to handling soft, hot, moist granules because of the tendency of the material to set.

Drying

In the absence of ammoniation, or when the heat of ammoniation is not sufficient to dry the granular product, drying in the **third stage** of the process is usually carried out in direct-heated, single-shell, rotary driers with either co-current or counter-current flow of flue gases entering the drier at 800-900° F. and leaving at about 200° F. Driers vary in size from 3 to 9 ft. in diameter and from 30 to 50 ft. or more in length, depending upon rated hourly output of product (2-20 tons) and the amount of water to be evaporated. At least one plant in the United States employs a roto-louvre type of drier which combines features of both co-current and counter-current drying. Drying equipment appears to be necessary in the average granulation plant in order to supply flexibility of operation on different grades of fertilizer, even though satisfactory drying of many ammoniated mixtures is accomplished without the application of external heat.

Cooling and Sizing

The cooling step in the **fourth stage** of the process is usually carried out in standard, rotary-type coolers, although some roto-louvre and multiple-shelf coolers are in use. Cyclone collectors are often used to recover dust from the drier and cooler. The dust is recycled in the process.

Sizing of the granular product receives close attention in some plants. Various types of screening equipment are used to give a product within a particle-size range of 1-4 mm. Oversize is crushed and returned to the screens. Fines are recycled in the process. In other plants the fine-mesh screen is not used and the crushed oversize is returned to the product. Fine-mesh screens are not entirely satisfactory owing to their tendency to blind. Various methods of process operation may be employed to reduce the load on the fine-mesh screen. Air-separation methods have been proposed as a substitution for, or as a supplement to screening.

Bagging and Storing

Bagging and storing operations in the granulation plant are similar to those in the ordinary mixing plant. During the shipping season the product frequently is bagged directly from the cooler. Owing to its free-flowing characteristic and the accompanying outward pressure on the walls of storage bins, granular fertilizer stored in bulk normally requires solid bulkheads of considerably greater strength than the open-slatted type customarily used to retain non-granular fertilizers. The occurence of severe bag-set or caking is much less frequent in granular than in non-granular products. Usually normal handling of bagged material substantially eliminates bag set. Protective measures against poor physical condition include drying the product to 2.5% moisture or less, cooling to within 15° F. of atmospheric temperature before bagging, maintaining a minimum proportion of fines and irregularly-shaped particles, and packaging the mixture in moisture resistant bags.

An interesting modification of the process for granulating mixed fertilizers by agglomeration is that of Procter and Ogilvie in England (See Process Progress, Vol. 1, No. 8, p. 1), which involves the addition of nitrogen and potassium compounds to a slurry of freshly acidulated superphosphate.

Challenges

Much research and development work remains to be done toward improvements in process control and in equipment best adapted to certain phases of the process. With continuance of the present trend toward increased production and use of high-analysis, granular fertilizers, further research is also needed to provide adequate information concerning the effect of such factors as degree of solubility, method of placement, soil characteristics, crop characteristics, and climate in relation to optimum particle size of various types of fertilizers.

What You Need, Mister, is PRODUCT CONTROL!

YOU DON'T NEED TO CONTROL YOUR TEMPER when you rely on Aquafil for product control. Aquafil makes it possible for you to market a better mixed fertilizer that is uniform . . . bag by bag. With Aquafil you no longer need to worry about "bag-setting" and costly reprocessing. Find out today about this new stabilizer for all mixed fertilizers that builds bigger profits for you.

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Product Stabilizer

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Please send me, at once your new folder telling how I can up profits in my mixed fertilizer operations.

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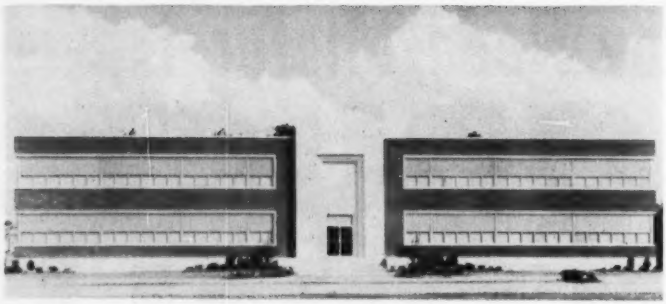


PULP RESEARCH OPERATIONS of the International Paper Company, Southern Kraft Division, will be conducted in this new $400,000 laboratory located at the division headquarters in Mobile, Alabama. Under the direction of John W. Gilbert, Research Director, and G. S. Mabrey, Associate Director of Research, a staff of 40 scientists and technicians will concentrate on basic pulp research problems of company-wide scope. The new laboratory building includes three pulp pilot plants and laboratories for chemical analysis, chemical research and physical research. In addition, there are three rooms where rigidly controlled humidity conditions can be maintained for special test work as well as facilities for photographic research and standard pulp and paper testing. The new building, which was formally opened on November 6, 1952, by Erling Riis, Vice President and General Manager of the Company's Southern Kraft Division, is probably the most modern and completely equipped pulp laboratory in the south.

ALABAMA

Lineville Gin & Fertilizer Co., Lineville, lost their main building in a $20,000 fire October 22. General Manager **J. W. Smith** reported the loss partly insured.

COLORADO

National Farmers Union Service Corporation, Denver, say their fertilizer program will be retarded by the refusal of RFC to grant them the $8,025,000 loan applied for a year ago. General Manager **E. C. Huff** said the organization had planned to use the money to acquire Utah, Idaho and New Mexico potash deposits, but meanwhile had acquired privately owned leases on phosphate rock lands in northeast Utah and, at a research cost of about $250,000, has uncovered what he called "tremendously valuable" potash ore deposits near Carlsbad, New Mexico. Lack of cheap electricity and of sulphur near the Utah deposits, however, is retarding the development of refining operations.

FLORIDA

Armour Fertilizer Works is completing plans for mining phosphate rock on its property near Bartow in Polk County, **John E. Sanford,** president, has announced.

The mining project will include a complete plant with washing flotation, drying, grinding, storage and shipping facilities. The rock will be used in the Armour triple superphosphate plant at Bartow and in its other manufacturing units throughout the country.

Construction of the new mine will begin shortly. A certificate of necessity was recently approved by NPA.

GEORGIA

Southern States Phosphate and Fertilizer Company, Savannah, had a dust explosion and fire in their plant October 24, but the fire was put out in a few minutes. Static electricity was blamed for the explosion and fire.

ILLINOIS

Central Illinois Fertilizer Co., Inc. has added Newman to its string of anhydrous ammonia distribution points. Two 30,000 gallon tanks have been set up there. CIF also operates at Ficklin and Tuscola.

* * *

Bonnett-Engh Fertilizer Company, Bloomington, are now making plans for a fertilizer plant, which they expect to start building about March 1. It will specialize on bulk sales, and expects to furnish application service. **Yontz Bonnett, Jr.** has an outstanding record in the use of fertilizer on corn. His partner, **Arthur C. Engh,** was formerly manager of by-products for **Inland Steel.**

* * *

Swift & Company's plant food division has announced a new, high-analysis, water-soluble Instant Vigoro.

KANSAS

Blue Valley Fertilizer Company, Marysville, which only recently went into production, is already planning to go on 24-hour operation. There are four owners: **Ralph L. Huffman** and **W. P. Glaspey,** who are resident managers; **C. H. Koelling** and **W. T. Thompson.** All four are originally from Topeka.

KENTUCKY

Elizabethtown Anhydrous Ammonia Co., Elizabethtown, has been chartered with a capitalization of $75,000.

NEW MEXICO

International Minerals & Chemical Corporation has announced the development of a new and revolutionary ore benefication process applicable to potash and phosphate as well as to many other types of ores, it was revealed in Carlsbad November 24 by President **Louis Ware.**

"This new process results in a great economy in comparison with any other present methods. The process which uses neither re-agents nor water, but is a dry benefication method, has been named the **LeBaron-Lawver Process,**" Mr. Ware said.

The new method of refining ore was developed under the direction of **Dr. Paul D. V. Manning,** International's vice president in charge of research, and **Dr. I. M. LeBaron,** director of International's research laboratories. Also associated with the project was **James E. Lawver** and others on the corporation's research staff.

Mr. Ware also announced that International will immediately build a new and larger pilot plant at the present Carlsbad Refinery to op-

Around the Map

erate continuously treating semi-commercial quantities of potash by means of the new method. Plans also are being developed for another shaft and mine on International's new ore body in the Carlsbad basin. Mr. Ware also announced that designs are nearing completion for constructing the first large potash-producing unit in that location which will utilize the new process.

In the LeBaron-Lawver dry beneficiation process the ore is ground, dried and given a simple and inexpensive treatment, after which the ground ore is passed between electrodes. As the treated ore passes between the electrodes it separates into various minerals.

Mr. Ware stated that the new process has been developed as the result of many years of research at International's experimental station and pilot plants at Mulberry, Florida, where large tonnages of potash ore were shipped in sealed containers from Carlsbad for the experiments. The Florida laboratories of the corporation comprise one of the largest research centers in the country working on the beneficiation of ores. A number of patent applications have been filed covering the new process and the equipment used.

MASSACHUSETTS

Borg and Co., agricultural chemical concern in Springfield, have purchased a 30-acre tract for expansion of their business. The concern is owned by Mr. and Mrs. **Robert M. Borg.**

MISSOURI

Thurston Chemical, Joplin, will offer a million par value worth of preferred, and 84,130 shares of common, the latter being a sale by present holders. The preferred is for expansion.

Monsanto Chemical's Santomerse 1 is being used to cut curing time for mixed fertilizers, by adding one pound per ton to the dry ingredients. Users are reporting better flow quality.

Monsanto won the all-industry gold "Oscar" presented by the Financial World publication for the best presentation of a financial report. Monsanto's was 52 pages long; clear, illustrated, and garnished with historic items of the early years of the company.

Monsanto has just issued a 16 page guide for the home gardner on the use of Krilium.

OKLAHOMA

The Lindsay Unit of the Garvin Murray Soil Conservation District, is a non-profit group of ten farmers with a warehouse in Lindsay to handle fertilizers and other agricultural material. It is supervised by an elected board: **C. S. Pratt,** chairman; **W. A. Cason,** secretary-treasurer: **Doc Baker,** Payne; **Harmon Hewitt,** New Hope; **Sam Merritt,** Maysville; **Buddy Bell,** Lindsay; **Beverly Parr;** Purdy; **A. J. Hinkle,** Foster.

OHIO

Nitrogen Division's $5,000,000 plant at South Point will be started this Fall, with **John J. Harte Co.,** Atlanta, Georgia under contract to design and build the plant, which will use the new nitro-phospatic process. Completion is expected by mid-Summer.

PENNSYLVANIA

Associated Cooperatives Inc. has made an arrangement with **TVA** to sell their fertilizer in this State for the first time. The analysis to be handled is 0-20-20 and the farmer must agree to use it on pasture or other sod crop. Pennsylvania Farm Bureau Cooperative Association will be the distrbutor.

* * *

Link Belt Company on December 3 held an open house for the press in their new plant at Colmar. A buffet luncheon was served following which a tour of the plant was made, and an inspection of a comprehensive exhibit of Link-Belt products. Following this, key customers, public officials, stockholders, employees and the community were given open house periods.

TENNESSEE

Tennessee Farmers Cooperative has gone into production with its second farmer-owned plant, one of 30,000 annual ton capacity, 16 miles south of Knoxville. Their other plant is at LaVergne and went into production early in 1951.

TEXAS

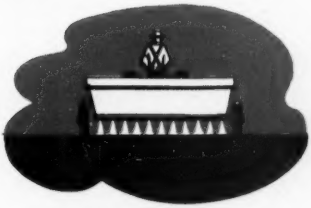
Mathieson Chemical has brought a fog filter to its Pasadena plant in an effort to cure the "neighbor trouble" there. This device bombards the air with high pressure water spray.

UTAH

Western Phosphates, the joint operation of **Stauffer** and **Garfield Chemical** near Salt Lake City is under way. The site is being prepared and it is now anticipated the

DAVISON GRANULATED Superphosphate 3 WAY CONTROL

STORAGE CONTROL—No caking or lumping while in storage.



APPLICATION CONTROL—No dusting or bridging; drills free and even.

FOOD CONTROL—Supplies plant food at a uniform rate.

Now it is possible for you to store superphosphate without fear of its caking . . . that is, if it is DAVCO GRANULATED SUPERPHOSPHATE. DAVCO Granulated Superphosphate will not become hard or caked . . . it is easier to apply in the field because there is no dusting or bridging over in the drill.

DAVCO Granulated Superphosphate gives complete coverage in the field . . . drilling freely and evenly . . . supplying each plant with a uniform quantity of nutrient phosphorus.

Get DAVCO Granulated Superphosphate . . . the superphosphate that gives you the added sales points through its 3-way control.

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PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS

plant will be in production within a year. Company officers are: **H. Stauffer**, president; **John Paul Jones**, vice-president and general manager; **F. W. Wider** and **M. L. Spealman**, vice-presidents.

AFRICA

Monsanto Chemicals Ltd, Rio Tinto, Frobisher Ltd. and the **Uganda Development Corp.** have jointly established **Tororo Exploration Co. Ltd.**, to explore deposits of phosphate and various ores near Tororo, Uganda. The Owen Falls Hydro-electric plant is nearby.

BRAZIL

Montecatini of Italy will put $10,000,000 into a DDT plant at San Paulo which will be able to produce enough for the entire Brazilian demand. It will be completed in 1954.

* * *

Pennsalt International and **Industria Quimica do Brasil** have equal interest in **Pennsalt Industrias Quikicas do Brasil** which is also going after the Brazilian insecticide business.

COLOMBIA

The Government is planning a $10,000,000 ammonia and urea plant at Barrancabermeja, to produce 50 tons of ammonia and 75 of urea daily. The site is near natural gas fields which have been under government control for a year.

GERMANY

Battelle Memorial Institute October 31 broke ground at Frankfurt-am-Main for a new research center to serve German industry. Another will be set up at Geneva, Switzerland, and a program of fellowships in Swiss and German universities will be created. Other Western European centers are planned for the future.

* * *

Knapsack-Griesheim A. G. has been established by five of the concerns which were split off from I. G. Farben and is located near Cologne. It is building a unit for the production of elemental phosphorus estimated at 4,500 yearly tons, which will be converted into 10,000 yearly tons of phosphoric acid.

ISRAEL

J. Green & Co., Tel Aviv, will introduce into Israel for the first time the conversion of garbage into fertilizer, having been granted a 30 year concession. Managing Director **A. S. Cohen** says the Tel Aviv garbage will yield about 60,000 annual tons of organic fertilizer, about 40% of the need in the Southern area of Israel. Construction will begin in six months.

MEXICO

Pan American Sulphur Co., having had Export-Import Bank approval on a loan for $3,600,000 will begin in February construction of a five million dollar Frasch plant at Jaltipan in Vera Cruz which will be completed by August of 1954. They expect to produce up to 600,000 annual tons of brimstone.

SPAIN

The Instituto Nacional de Industria (INI) has organized a firm known as **Fodina, S. A.**, to exploit reserves in Catalunya and expects some production by 1955 and an output of 75,000 tons by 1960.

It has not been definitely decided to continue work on the Navaree deposits, but INI is considering the development of two independent shafts which could produce 200,000 tons of potash by 1960. This would bring total Spanish production to 475,000 tons, and it might be increased to 600,000 tons, although INI states that these plans are only projects.

It is difficult to estimate future exports of potash. The amount available will depend upon greater production, the increase in output by private industry, and domestic consumption. Domestic use of potash was estimated at 55,000 tons in 1951 and is expected to total 75,000 tons by 1955; a desirable figure would be 300,000 tons.

Two French companies have interests in Spanish potash firms.

TURKEY

Makina ve Kimya Endustri Kurumu, a government group, is hunting $17,000,000 of US money and US expecting to produce nitrogen compounds. Their goal: 6,000 annual tons of nitric, 2,000 of ammonium nitrate, 3,,000 of urea, 75,000 of ammonium nitrate-ammonium sulfate, 41,000 of ammonium nitrate-calcium carbonate.

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AMMONIUM NITRATE-LIME

20.5% NITROGEN

2 FERTILIZERS IN 1
Contains 10.25% quick-acting *nitrate* nitrogen.
Contains 10.25% longer-lasting *ammonia* nitrogen.

GREEN PELLETS READY TO USE
Sized for flow and ease of application in broadcasting, top dressing, side dressing, and irrigation. Non acid-forming.

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At low cost, Calmonite furnishes Nitrogen in the 2 forms needed by all plants — for rapid, early vigorous growth and sustained development.

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Contains 35% to 40% calcium carbonate, secondary plant-food essential to soil productivity and good crop yields.

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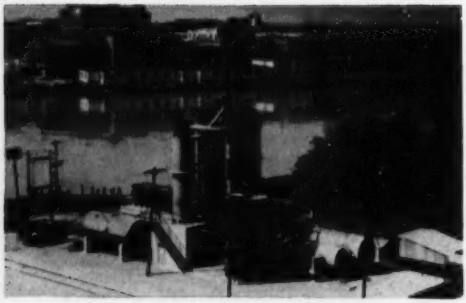

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MARIETTA concrete stave silos can be erected in any arrangement—line, cluster, or combined with existing units for added storage. They will protect your agricultural chemicals from fire, acid, air, moisture and the elements and reduce insurance rates. Require little or no upkeep expense. Can be equipped with conveyors and hoppers to facilitate handling, increase plant value.

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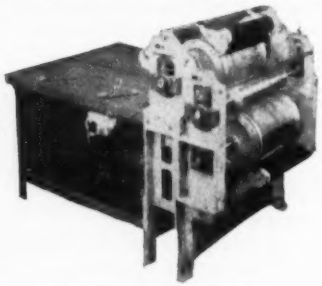

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PESTICIDES

Herbicide and Defoliant IAC Recommendations

The Herbicide and Defoliant Chemicals Industry Advisory Committee recommended to the National Production Authority, Department of Commerce, that the agency make appropriate representations to other government agencies to obtain more definite information on exported weed killers.

The committee suggested that the present "basket" classification be broken down as follows: (1) The Herbicides 2, 4-D, 2, 4, 5-T and TCA; (2) Other organic herbicides and (3) Inorganic herbicides.

The committee also recommended that NPA makes representations to the Tariff Commission to report specifically the monthly production of 2,4-D acid and 2,4,5-T acid in order to eliminate overlapping and duplication when statistics include salts, esters and amides.

A representative of the Office of International Trade told the committee that exports of chemical weed killers amounted to 8½ million pounds for the first eight months of 1952 with total exports for the year estimated at 10 to 12 million pounds. Exports chiefly went to Canada, Cuba, Colombia, Venezuela, Peru, Argentina, British Malaya and Turkey.

A Department of Agriculture representative stated that about two million acres of cotton would be defoliated this year. Defoliants, he said, cause cotton bolls to open faster, speed machine and hand harvesting, reduce trash in machine harvesting, cut down insect and aphid infestation and aid in cotton pest control.

Agricultural experts, the spokesman said, expect the use of defoliants to increase because they are an aid in machine harvesting of crops.

NPA told the committee that:

(1) Production of 2,4-D and 2,4,-5-T is currently in balance and programmed facilities should be adequate to take care of anticipated demands.

(2) The use of sodium chlorate as a defoliant is probably about 10-15 percent of total agricultural supply and will amount to about 6-6½ million pounds for 1952 and to 7-8 million pounds for 1953.

(3) Supplies of chlorine, phenol and sodium chlorate are better than in balance with requirements.

(Thousands of Pounds)

Commodity	1951-52 Usage[1]	1951-52 Probable Supply	1952-53 Requirements[1]	1952-53 Probable Supply
Sodium Arsenite	5,000	5,000	5,000	5,000
Sodium Chlorate[2]	[3]43,750	43,750	52,500	52,500
2,4-D	25,000	26,000	32,000	[4]28,000
2,4,5-T	3,000	3,000	5,000	[4]6,000
Other[5]	80,000	90,000	79,000	90,000
Total	156,750	167,750	173,500	181,500

[1] Usage and requirements are for agricultural year, October 1 through September 30, and include exports.
[2] Supplies for herbicidal and defoliant use only.
[3] According to information obtained by the Department of Agriculture, 60 percent was consumed as agricultural weed killers, 34 percent for railroad weed killing, and 6 percent for defoliant purposes.
[4] Capacity for production.
[5] "Other" includes ammate, borates, calcium cyanamide (defoliant grade), dinitro compounds, IPC, monosodium cyanamide, pentachlorophenol, potassium cyanate, TCA, etc.

Supply and requirements of principal herbicides and defoliants and the 1952 and 1953 outlook were outlined by NPA as follows:

P. H. Groggins of NPA's Chemical Division presided. The following members from industry attended:

Thomas R. Cox, Sr., American Cyanamid Co.; Warren Moyer, Chipman Chemical Co.; Wilbert T. Newton, Columbia Southern Chemical Corp.; R. F. Prescott, Dow Chemical Co.; E. R. Cashman, E. I. du Pont de Nemours & Co.; J. G. Brunton, Kolker Chemical Works, Inc.; E. W. Gamble, Monsanto Chemical Co.; C. A. Stiegman, Oldbury Electrochemical Co.; R. S. Roeller, Pennsylvania Salt Mfg. Co.; W. S. James, Pittsburgh Agricultural Chemical Co.; Carlos Kampmeier, Rohm & Haas Co.; Joseph C. Schumacher, Western Electrochemical Co.

Pink Boll-Worm "Beltwide Menace"

The alarming spread of the pink boll-worm and its threat to American cotton production will command major attention during sessions of the second day of the sixth annual Cotton Insect Control Conference in Memphis, Tenn., December 10-11.

At the meeting, sponsored by the National Cotton Council, Avery S. Hoyt, Washington, chief of the Bureau of Entomology and Plant Quarantine, will review the steady advance of the pest into new areas. Subject to his address will be, "The Pink Bollworm Situation—A Beltwide Menace."

Other speakers will describe quarantine and control programs now in effect and plans for expanded pink bollworm research.

The Bureau of Entomology and Plant Quarantine reports that, after building up this year to the worst infestation in U. S. history, the pink bollworm is on the move into new territory. The pest has spread to at least 27 additional counties and parishes in east Texas and Louisiana.

Through its Beltwide Pink Bollworm Committee, the Cotton Council has been working actively for expanded research to combat the pink bollworm threat.

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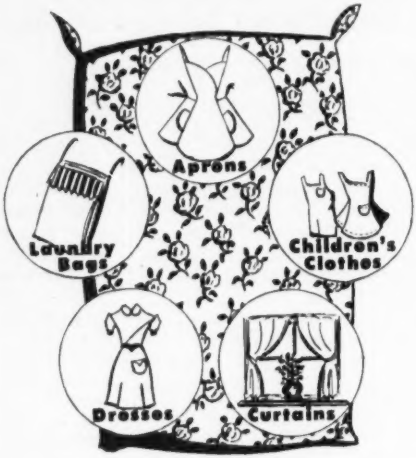

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Antibiotics PROVE AGRICULTURAL VALUE

AS AGRONOMISTS MAKE FIELD AND LABORATORY TESTS

A story of importance is beginning to unfold in which antibiotics play a major role. Dimly, most of us know of antibiotics. We know better such names as terramycin and pencillin. But we don't know much about them. We will, and soon, it seems from the reports that are now piling up.

These drugs are extracted from the molds in common soils. Left in the soil the molds are harmful to crops. Extracted and converted into antibiotics, the resulting chemicals can help control plant disease as they are now controlling human and animal diseases.

The story begins with Dr. Louis G. Nickell, head of the phytochemistry department of Chas. Pfizer & Co., leading producer of antibiotics. Dr. Nickell has successfully speeded up the growth of sweet corn and other major crop plants, starting with stimulation of the germinating seed. Terramycin in the greenhouse has made corn treated with terramycin grow faster in the first four weeks than untreated corn . . . and it only takes microscopic quantities.

But that is only the beginning of the story, for outside as well as inside the Pfizer laboratories, work has been quietly going on at various points around the map, and on various projects, in the chemical control of plant disease, as well as the stimulation of growth.

Here is a round-up of such projects as we have them here to date:

Dr. Frederick C. Visor, chief plant pathologist of the Pfizer company has successfully controlled the most costly of shade tobacco disease downy mildew, using minute quantities of the antibiotics thiolutin and terramycin. In his laboratory, a solution of thiolutin as dilute as 15 parts per million destroyed the bacteria causing another disease of tobacco, black shank.

Dr. Visor predicts the same fate for fire blight and peach bacterial spot, scourges of the fruit industry, which have caused damage estimated at many millions of dollars in recent years.

Because of the antibiotics' peculiar ability to spread throughout the plant by means of the inner circulatory system, U. S. Department of Agriculture scientists report the possiblity of fighting plant diseases with a 'shot" of the substance, in much the same fashion as pencillin and terramycin are administered to human beings and animals.

Dr. John W. Mitchell of the U.S. D.A. inoculated bean plants against the "halo blight" by applying a small quantity of streptomycin to the stems of the plants in a lanolin paste. This treatment prevented the blight, which attacks the leaves of the bean plant. Dr. Mitchell concluded that the antibiotic entered into the tissues of the stem and then circulated upward to the leaves.

The possibility of injecting the trunk of the fruit trees suffering from fire blight and peach brown rot has been investigated and found practical under experimental conditions by Dr. Visor and research workers in the Department of Agriculture.

A simple method of injection or inoculation might well replace the expensive and wasteful dusting and spraying systems now in general use. In addition, the small non-poisonous quantities of antibiotics required, eliminate the danger of toxic residues on vegetables and fruits, a danger ever-present in orthodox spraying and dusting.

Research workers are confident that fear of poisonous residues may be dismissed when antibiotics replace such present-day fungicides as copper sulfate. Extensive experiments have been carried out with streptomycin to prevent bacterial soft rot of the fresh spinach sold in pliofilm packages.

CAN WE ADVANCE THE SEASONS?

Dr. Wilson L. Smith Jr., U.S.D.A. reports effective and safe results when spinach was dipped in a water solution containing one tenth of one per cent streptomycin sulfate.

The wide interest in antibiotics as fungicides may be judged by reports of experimental work at the recent meetings of the **American Institute of Biological Sciences at Ithaca, N. Y.** There were 12 papers dealing with the subject.

Dr. John M. Dunleavy, University of Nebraska, reported the antibiotic subtilin, extracted from Nebraska soil, was antagonistic to the bacteria Rhizoetonia, which causes severe rotting of the sugar beet plant.

Dr. Thomas D. Connell, Louisiana State University, found a large number of antibiotics in the soil of Louisiana sugarcane fields which attack and destroy the fungus, Pythium arrheramanes, cause of sugarcane root-rot.

From **Dr. Leander F. Johnson** of the same university the conference learned that this root-rot disease also infects corn and can be controlled under laboratory conditions with the

antibiotic molds, specicaria, penicillium and aspergillus.

Specific recommendations for use of antibiotics in the orchard, principally against peach brown-rot and fire blight, may be expected in the near future. **Dr. John C. Donegan, U.S.D.A.**, is reported to be in the final stages of his successful work on peach bacterial spot, Xanthomonas Pruni. Field tests are expected to determine the most feasible method to apply a specific antibiotic cure for fire blight. For more than 100 years this disease has spread unchecked, wiping out the pear growing industry east of the Mississippi and causing serious economic losses to apple growers.

Whether the antibiotics may be successfully used eventually to do two jobs at once—speed growth and check disease—depend upon further applied research. Present indications are that different concentrations of the antibiotic are required for disease control and for growth.

Dr. Nickell has stepped up the rate of growth of corn, radishes, sorrel (a type of spinach) and pansies in the sterilized soil of his greenhouse laboratory and is now at work with a wider selection of plants. Field tests to determine how the antibiotics act under outdoor conditions also are underway.

The question has been raised: "Is this earlier growth or total growth?" Whether corn treated with terramycin and grown to maturity would in the end be taller than the corn not treated will be answered by Department of Agriculture experiments now in progress. Dr. Nickell's work ended after 46 days, whereas from 70 to 90 days are required for corn to produce full-grown kernels.

This question may not be important with respect to certain vegetable crops grown for their leaves, stalks and roots. For example, lettuce, cabbage, celery and spinach are harvested before reaching a mature stage. In fact all three would be useless for market purposes if permitted to grow to the flowering and seed stages. The same thing may be said for carrots, beets, radishes and turnips. "Early growth" therefore is in effect "total growth" in many crops.

Treatment of the seed of economic crops to shorten the period from the planting of the seed to appearance of the young plant above the soil level, is a phase of Dr. Nickell's work which may be of immediate practical importance, requiring a minimum of further research. **Stealing a march on the seasons in this manner perhaps by as much as 10 days could mean millions of dollars in farm crops in the northern short-season areas, and in those parts of the world which suffer severe drought conditions at definite periods of the year.**

Dr. Nickell's experiments with speeding up the germination of seed, particularly that of the century plant, Agave toumeyana, has convinced him that the response is a widespread phenomenon. This particular seed was chosen for the experiment because under normal conditions it germinates 100 per cent and thus provides a good subject for measuring the rate of growth

and the speed of germination due to stimulation by the antibiotics. A significant increase in speed of germination was noted in the seeds treated with 2 parts per million of thiolutin. Responses also were obtained with the use of terramycin, streptomycin and pencillin.

Closely associated with the use of antibiotics in plant and animal work —but part of neither—is the use of terramycin to protect the honey bee from the ravages of the disease, foulbrood. This latest development, reported by U.S.D.A. investigators, would indicate that antibiotics now have completed a cycle in their service to humanity, from direct help in human disease, to protection of farm animals and crops, to assisting finally those insects without whose aid in the pollination of plant blossoms there would be sufficient food for neither man nor beast.

Controls Revised On Nitrate Imports

The U. S. Coast Guard November 3 cancelled certain restrictions on ships carrying calcium ammonium nitrate fertilizer which has been barred from all major American ports since the Texas City explosion several years ago, requiring unloading at some isolated spot. Under revised rules, such ships may come into port.

A ship carrying this type of fertilizer blew up in the Texas City harbor, setting off a chain of explosions that destroyed part of the city and killed numerous persons.

The order was cancelled by Vice Adm. Merlin L. O'Neill, commandant of the Coast Guard.

Sulphur Controls Lifted By NPA

Removal of limitations on the use of sulfur and elimination of sulfur inventory controls were announced November 5 by Thomas C. Keeling, Jr., Director of the Chemical Division of the National Production Authority, Department of Commerce.

This action revokes NPA's Sulfur Order, M-69. The order, as amended January 1, 1952, restricted sulfur use to 90 percent of 1950 usage and provided for full support for certain defense and essential civilian requirements. As originally issued June 1, 1951, M-69 limited sulfur users to 100 percent of their 1950 usage.

Revocation of the order was made possible, Mr. Keeling explained, because sulfur supply has caught up with demand, with an improved position in sulfur inventories. The improved supply position resulted in large part because actual consumption fell below the authorized use during the first eight months of 1952.

Estimated U. S. consumption of sulfur plus exports in all forms except spent sulfuric acid is expected to total 6,090,000 long tons as compared with an estimated supply (production plus imports) of 6,524,000 long tons. As a consequence, producers' and consumers' inventories are expected to increase by 434,000 long tons by the end of 1952. During 1953 further improvement in inventories is expected.

Removal of inventory limitations, Mr. Keeling pointed out, will

distribute sulfur inventories more widely throughout the country.

Mr. Keeling emphasized that revocation of M-69 would in no way affect the ability of the United States to meet any export commitments for essential foreign needs which have been or may be assumed by the U. S.

Lime

(Continued from page 53)

part of the over-all educational program. Efforts should also be made to enlist the cooperation of bankers, landlords, and other interested groups in the benefits that can come from more efficient use of fertilizer and lime.

To assure economy in the efficient use of fertilizer, special attention should be given to the development of research programs aimed at getting more even distribution and use of fertilizer throughout the year. Special efforts should be made, the advisory group believes, to secure the full support of newspapers, farm journals, radio and television, and othe appropriate informational media in telling farmers and the general public about the program.

The members of the advisory group which was appointed by the USDA-Land Grant College Steering Committee are:

W. N. Watmough, Jr., Davison Chemical Company, Baltimore, Md., (represented at the meeting by R. D. Goodall); B. H. Jones, Sunland Industries, Fresno, Calif.; Arthur R. Mullin, Indiania Farm Cooperative Association, Inc., Indianapolis, Ind., (unable to attend); George R. Petitt, Potash Company of America, Washington, D. C.; W. T. Wright, F. S. Royster Guano Company, Norfolk, Va.; John R. Riley, Jr., Spencer Chemical Company, Kansas City (represented by Geo. W. Taylor); Paul T. Truitt, American Plant Food Council, Washington, D. C. (represented by J. R. Taylor, Jr.); and Russell Coleman, National Fertilizer Association, Washington, D. C. (represented at the meeting by W. R. Allstetter).

Mississippi Fertilizer Conference

Some 125 attended the fertilizer conference held in Biloxi October 29-31. Unlike most meetings, this one began with a banquet, presided over by Si Corley, Commissioner of Agriculture. The program led off with an address by Dr. Clay Lyle, Dean and Director of Agricultural Services, Mississippi State. Then John A. Campbell, superintendent of the Truck Crop Experiment Station, spoke on Irrigation.

That afternoon, Owen Cooper, v-p and general manager of the Mississippi Chemical Corporation spoke. The meeting concluded with a panel discussion featuring Russell Coleman, N.F.A.; John R. Taylor, APFC; Marion G. Field, Meridan Fertilizer Factory; Ernest Spivey, Miss. Federated Coop.; and Andy Speight, IMC.

OBITUARIES

Douglas Kelly, 62, Southern divisional manager of Armour Fertilizer for 33 years, died November 9 in New Orleans, of a heart attack.

Russell S. Roeller, 60, general salesmanager of Pennsalt, died November 12 after a brief illness in Phoenixville, Pennsylvania. He joined them in 1922.

James M. Sample for fifteen years with Lyons Fertilizer Company, Tampa, Florida and vice-president in charge of sales there before going to Clinton Foods Inc. died October 25 of coronary thrombosis.

George Freeman Tubb, Sr., 42, chief chemist for Armour Fertilizer, Jacksonville, died suddenly November 15 in a hospital there.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

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